...OGY DEPARTMENT

THE PAPER INDUSTRY and PAPER WORLD

...N EDUCATIONAL NEWS MAGAZINE—MARCH, 1948

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DETROIT

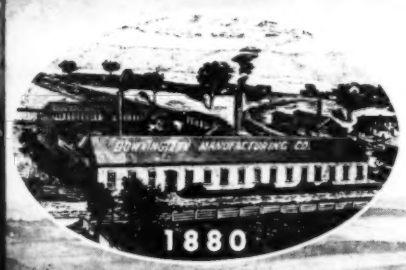
Modern, Integrated Facilities

Engineering • Patterns • Castings • Machining • Assembly • Testing

Downingtown Mfg. Co., Downingtown, Pa.

D

DOWNINGTOWN
Designers & Builders
Paper Making Machinery



–count on UFORMITES 467 and 470 to meet requirements at low cost

Sanitary garbage bags *must* have high wet strength properties to prevent breakage. Here, as in many other applications, the UFORMITES supply that important quality . . . efficiently, economically.

UFORMITE 467 was specifically developed for use with Kraft by beater addition. UFORMITE 470 is recommended especially for sulfite stocks but can be used advantageously with Kraft, rag and groundwood.

If you are manufacturing bags, wrapping paper, toweling, soft tissues, glassine, map, chart or ledger paper, you'll want to use these urea formaldehyde resins. Why? Because neither UFORMITE 467 nor UFORMITE 470 affects the color, odor or taste of paper. Because no special equipment or handling is required for their preparation or use. Because as little as 1% resin on dry fibre weight will increase wet strength as much as 300%. Because the UFORMITES improve dry tensile and Mullen, fold, uniformity of sizing, and coating service characteristics.

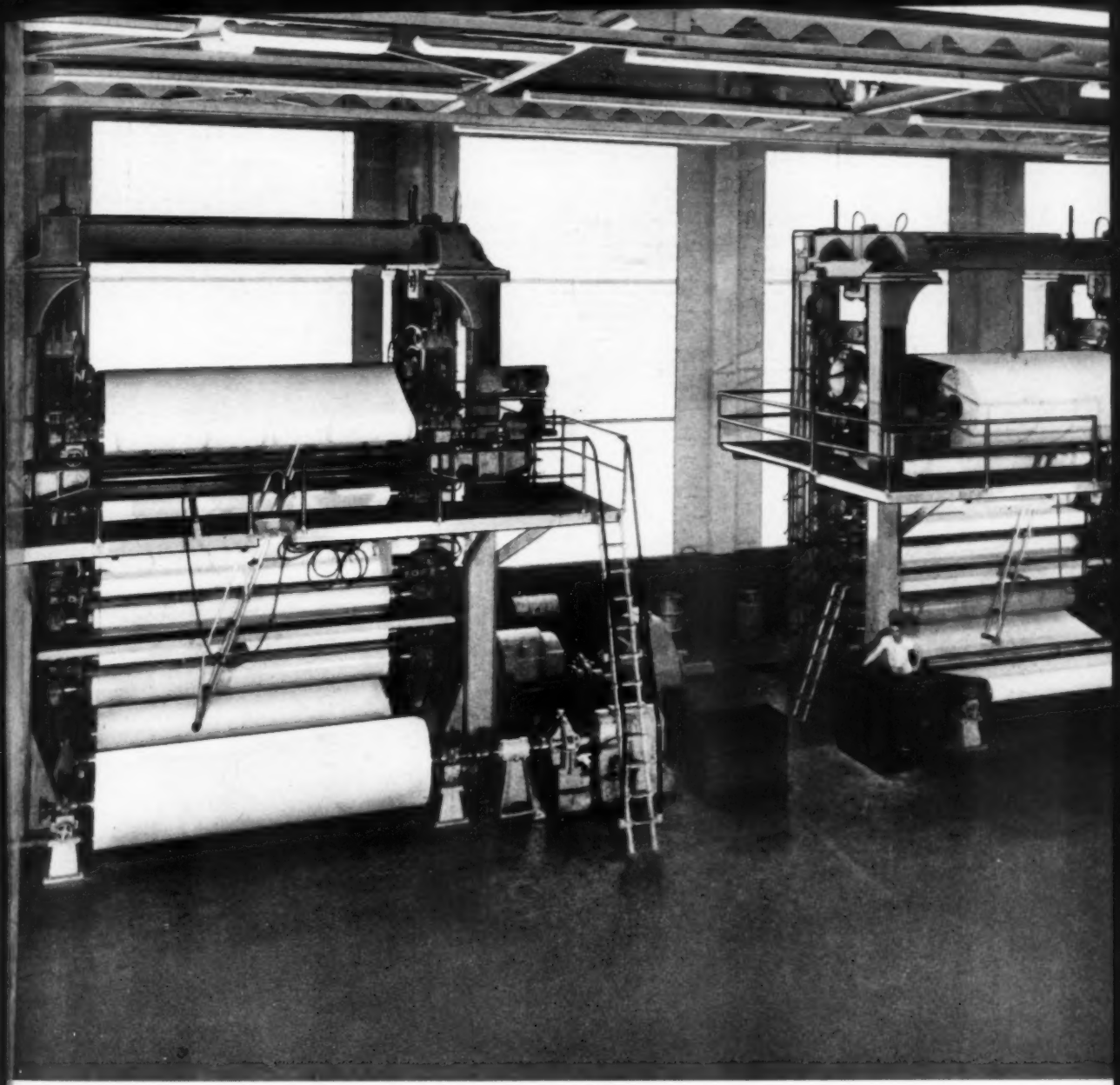
See for yourself how the UFORMITES, at low cost, can increase the value of your paper production. Write for full details today.

UFORMITE *is a trade-mark, reg. U. S. Pat. Off.*

Represented by Cia Rohm y Haas, S.R.L. Carlos Pellegrini 331, Buenos Aires, Argentina, and agents in principal South American cities.

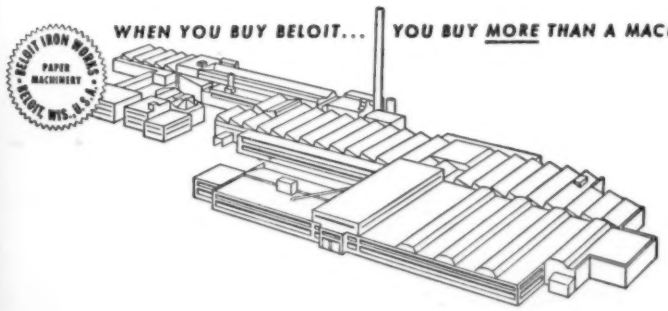
THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.



New supercalenders, new speeds

New machine coated book installation in the West Linn, Oregon, mill of Crown Zellerbach Corp. includes three new Beloit supercalenders, two shown above. Designed for speeds up to 1600 feet or more per minute, they are equipped with the latest electric drives. Interlocking inset controls make operation of machines practically "push button" automatic. *Beloit Iron Works, Beloit, Wisconsin.*



WHEN YOU BUY BELOIT... YOU BUY MORE THAN A MACHINE!

BELOIT

PAPER MACHINERY

The Sky's the Limit with an American Revolver

How much money can you save by making a pulpwood pile *higher*, instead of *longer*?

The obvious answer is: a lot of money. And that explains the growing interest, among pulpwood men, in the AMERICAN Revolver. For here is a crane that builds piles to completely new heights . . . stacks the wood swiftly and neatly . . . and sometimes actually makes a small ground area more valuable than a great, sprawling storage yard.

Made in five basic models, the AMERICAN Revolver offers stationary or gantry-mounted installations, with boom lengths up to 150 feet; lifting capacities up to 150,000 lbs. Power may be electric, steam, gasoline, diesel or diesel-electric. Equipped with grapple, hook, sling or bucket, these jumbo cranes have unlimited usefulness in moving other materials, too. Write for detailed information.

American Hoist
and DERRICK COMPANY

St. Paul 1, Minnesota

Plant No. 2:
So. KEARNY, N.J.

Sales Offices:
NEW ORLEANS
NEW YORK • CHICAGO
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OTHER PRODUCTS:
HOISTS • DERRICKS
CAR PULLERS
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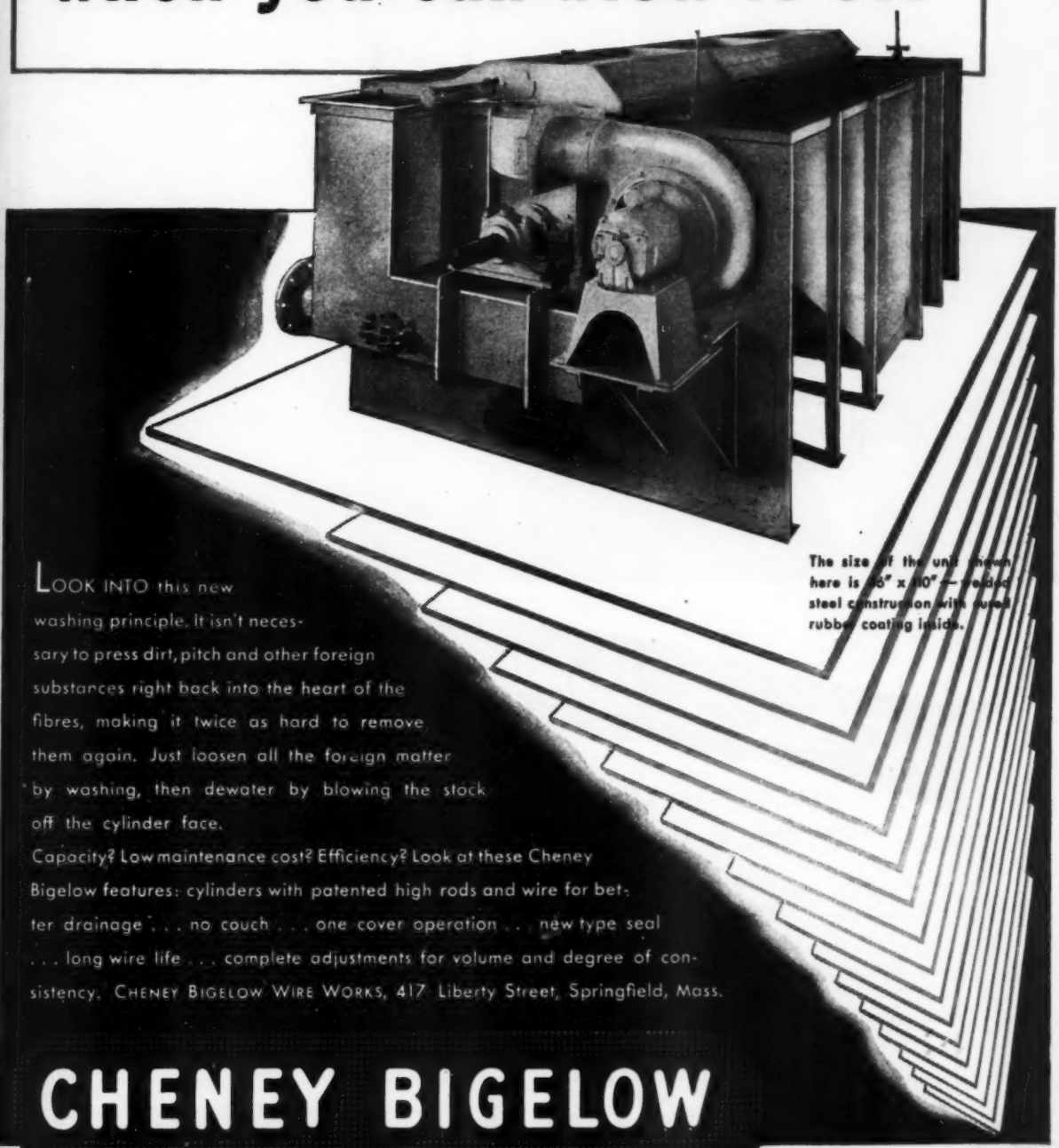
LOCOMOTIVE CRANES
AMERICAN HANDIWINCH
LEVEL LUFFING CRANES

8403

WHY SQUEEZE IT OFF
when you can blow it off



The size of the unit shown here is 36" x 40" — welded steel construction with cured rubber coating inside.

LOOK INTO this new washing principle. It isn't necessary to press dirt, pitch and other foreign substances right back into the heart of the fibres, making it twice as hard to remove them again. Just loosen all the foreign matter by washing, then dewater by blowing the stock off the cylinder face.

Capacity? Low maintenance cost? Efficiency? Look at these Cheney Bigelow features: cylinders with patented high rods and wire for better drainage . . . no couch . . . one cover operation . . . new type seal . . . long wire life . . . complete adjustments for volume and degree of consistency. CHENEY BIGELOW WIRE WORKS, 417 Liberty Street, Springfield, Mass.

CHENEY BIGELOW

Pulp and Paper Mill Equipment

Fourdrinier Wires • Dandys • Cylinders • Wire Cloth

isn't that the Mathieson Plant?

"It's one of them, Mr. Jones—the Niagara Falls plant."

Yes, Mr. Jones and there's another at Saltville, Va., to serve the southeast, and a third at Lake Charles, La., serving the southwest. With three plants, Mathieson offers triple flexibility in deliveries of caustic soda. Call it three sources of supply. That's why weather, breakdowns, railroad or labor conditions seldom keep Mathieson from making prompt deliveries.

The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York 17, N. Y.

Caustic Soda...Soda Ash...Bicarbonate of Soda...Liquid Chlorine...Chlorine Dioxide Ammonia, Anhydrous & Aqua...HTH Products...Dry Ice...Carbonic Gas...Sodium Chlorite Products...Sodium Methylate.

Mathieson
CHEMICALS

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U. S. Pat. Off.)

VOLUME 29 - - - - MARCH, 1948 - - - - NUMBER 12

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PERKINS

DIAMOND JUBILEE

Perkins Calender Rolls are the result of the longest and broadest experience. No Calender is better than the rolls in it.

B. F. PERKINS & SON, Inc.
ENGINEERS AND MANUFACTURERS
HOLYOKE, MASSACHUSETTS

Announcing a

25% INCREASE IN CAPACITY RATINGS

of TIMKEN® bearings

MAKES POSSIBLE THE USE OF SMALLER BEARINGS, WITH SAVINGS IN SPACE, MATERIALS AND COST—A RESULT OF YEARS OF CONSTANT IMPROVEMENT IN TIMKEN BEARING QUALITY

IN the ten years since the present load capacity ratings of Timken tapered roller bearings were established, Timken bearings have been steadily improved. Improved so much that today the load carrying capacity of Timken bearings is a good *25% greater* than it was 10 years ago!

As a result, The Timken Roller Bearing Company is now able to announce a 25% increase in the load capacity ratings of all Timken bearings—following a careful review of laboratory studies on fatigue life machines over the past ten years, together with close observation of bearing performance in the field.

Permits Use of Smaller Bearings

Now you can safely carry your present bearing loads on smaller size Timken bearings. Reductions in size of shafts and housings are possible. Products can be made more compact—lighter in weight. You have an opportunity to save both on bearing costs and material costs. And this increase in ratings should enable engineers to utilize the advantages of Timken bearings in an even broader variety of applications than has been practicable in the past.

Result of Constant Quality Improvement

This 25% increase in Timken bearing capacity ratings is based on continued improvement in the quality of Timken tapered roller bearings over the past 10 years. It is due to a number of factors, including improved alloy steels made in our own Timken steel mill specifically for anti-friction bearings, better metallurgical control in the processing of this steel, more accurate manufacturing equipment, greatly improved surface finishes, and more accurate inspection methods. That these improvements in Timken bearing quality have resulted in 25% greater load capacity has been conclusively demonstrated by years of exhaustive laboratory and field studies!

New Engineering Journal to Give Facts

A new Timken Engineering Journal is now in preparation which will give complete capacity rating tabulations and will also include new bearings introduced since the last publication. Pending publication of the new Journal you may take full advantage of the 25% capacity increase by multiplying the existing ratings by 1.25.

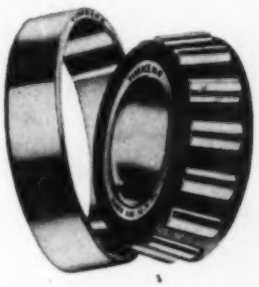
For further assistance in the application of Timken bearings, call upon our field engineers or our Engineering Department.

Timken tapered roller bearings take any combination of radial and thrust loads, hold shafts in rigid alignment, assure precision and minimize friction. The 25% increase in load capacity ratings is the *latest* example of Timken leadership in serving the bearing needs of all industry ... one more reason why it pays to look for the trade-mark "Timken" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

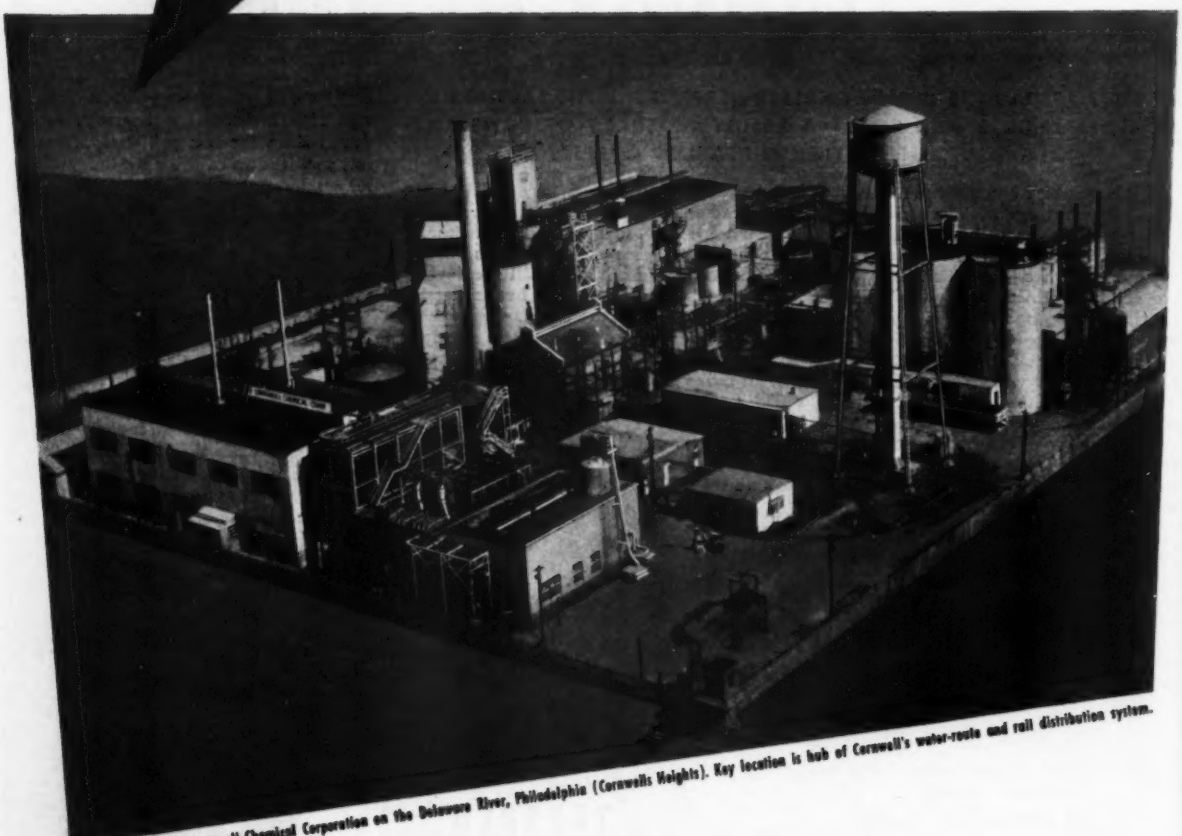
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◐ AND THRUST ⊣◐⊢ LOADS OR ANY COMBINATION ✳

SALT CAKE

.....paper makers' grade



Plant and Laboratories of the Cornwell Chemical Corporation on the Delaware River, Philadelphia (Cornwells Heights). Key location is hub of Cornwell's water-route and rail distribution system.

Cornwell Chemical Corporation

CORNWELLS HEIGHTS (PHILADELPHIA), PA.

Telephone: Torresdale (Phila.) 4-7358 Cornwells 0302 Cables: SEECHEM

on

P A.

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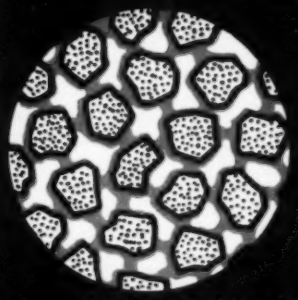
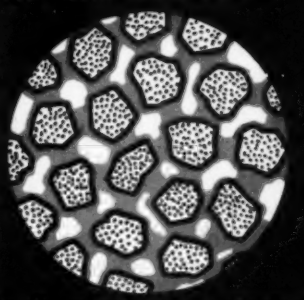
Here's How We Fit a Pulpstone *to Your Particular Job*



This schematic diagram shows that a pulpstone is composed of grains of abrasive (dotted) held together by "posts" of bond (red) and with voids or open spaces between them.



This diagram shows another pulpstone of the same grit (grain size) and structure (grain spacing) but of a harder grade as indicated by the thicker and stronger bond posts.

FIRST we select the correct abrasive — Alundum stones are best for some mills, 38 Alundum for others and Crystolon stones for still others.

Next comes the choice of grit size — fine grit stones for book papers, coarse grit for newsprint or insulating board.

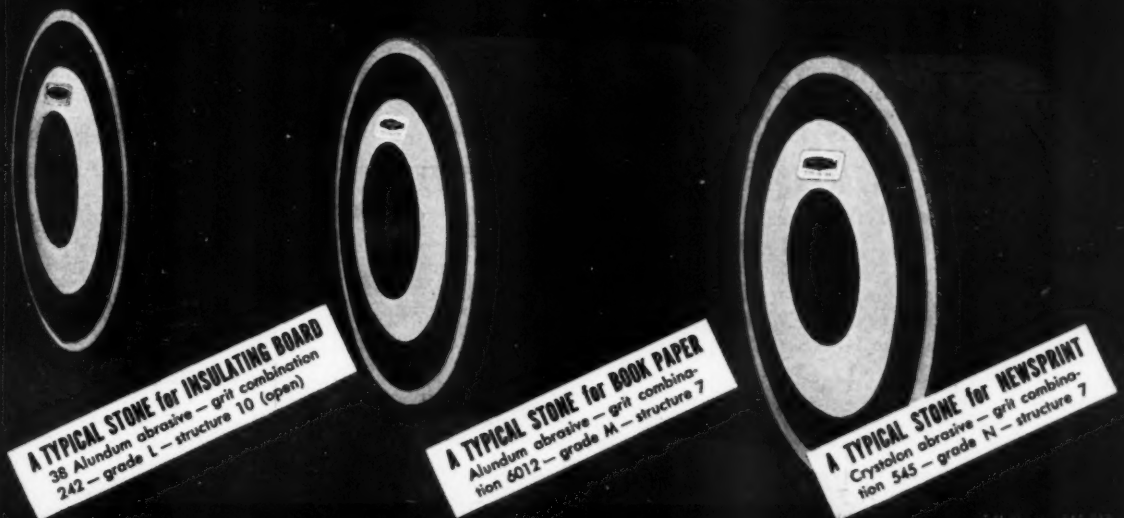
Then comes the selection of the correct grade which, in grinding wheel terminology, means the hardness of the stone. And this matter of hardness is not determined by the hardness of the abrasive (that remains constant) but by the amount of bond which holds the grains together. The more bond the harder the stone.

The fourth variable is the structure of the stone — the spacing of the grain by the Norton Controlled Structure process. For example, an open structure stone (wide grain spacing) is used for producing insulating board, and more dense structures for newsprint and book papers.

Yes, your Norton Pulpstones are "tailor-made" for their job — to produce *your* type of pulp from *your* type of wood with *your* type of equipment.

NORTON COMPANY, WORCESTER 6, MASS.
Norton Company of Canada, Ltd., Hamilton, Ont.

NORTON ABRASIVES


A TYPICAL STONE for INSULATING BOARD
38 Alundum abrasive — grit combination 242 — grade L — structure 10 (open)
A TYPICAL STONE for BOOK PAPER
Alundum abrasive — grit combination 6012 — grade M — structure 7
A TYPICAL STONE for NEWSPRINT
Crystolon abrasive — grit combination 545 — grade N — structure 7

Since 1903-

LINDSAY FOURDRINIER AND CYLINDER WIRES FOR PAPER MAKING..

THE LINDSAY WIRE WEAVING COMPANY
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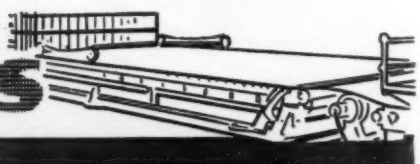
Lindsay **WIRES**



SPECIALISTS GET BETTER RESULTS

. . . in law

and

. . . in VALVE MANUFACTURE

ALOYCO GATE VALVE
No. 111

ALOYCO
GLOBE VALVE
No. 311

ALOYCO SWING CHECK VALVE
No. 571

● You wouldn't hire a criminal lawyer to fight a patent suit, would you? Well, specialization is just as important in the manufacture of corrosion-resistant valves, as it is in law.

Any manufacturer with experience in the fabrication of stainless steels and related alloys knows that they require entirely different handling from other metals. Different treatment is required for stainless steel all along the line—in the design of the pattern, foundry practices, machining and in the mechanical design of the valve itself.

Such knowledge is best developed by specialization—and this is what Aloyco offers. *We make nothing but valves.* And we make these valves of corrosion-resistant alloys exclusively. Consult us on your requirements.

ALOYCO

STAINLESS STEEL VALVES AND FITTINGS

ALLOY STEEL PRODUCTS COMPANY, INC.

KELGIN *smoothes the way...*

For smooth, flawless paperboard surface – the kind that assures clean, sharp printing, true color values and full ink brilliance – you can count on Kelgin, the modern algin surface sizing agent.

Kelgin provides an unexcelled film barrier; makes possible a surface that is uniformly smooth and dense for even penetration of printing inks, oils and waxes.

Equally soluble in both cold and hot water, Kelgin is readily adaptable to water box application in the calender stacks. It causes no picking, foaming or sticking to the rolls. And it reduces curl tendencies of sheets, thus eliminating need for back sizing.

Kelgin is a highly refined product of nature, free of impurities and extremely economical. Let us give you the story in terms of your own paperboard application.

KELGIN ... A PRODUCT OF

KELCO

COMPANY

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ALGIN
PRODUCT

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31 Nassau Street
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530 W. Sixth Street
LOS ANGELES—14

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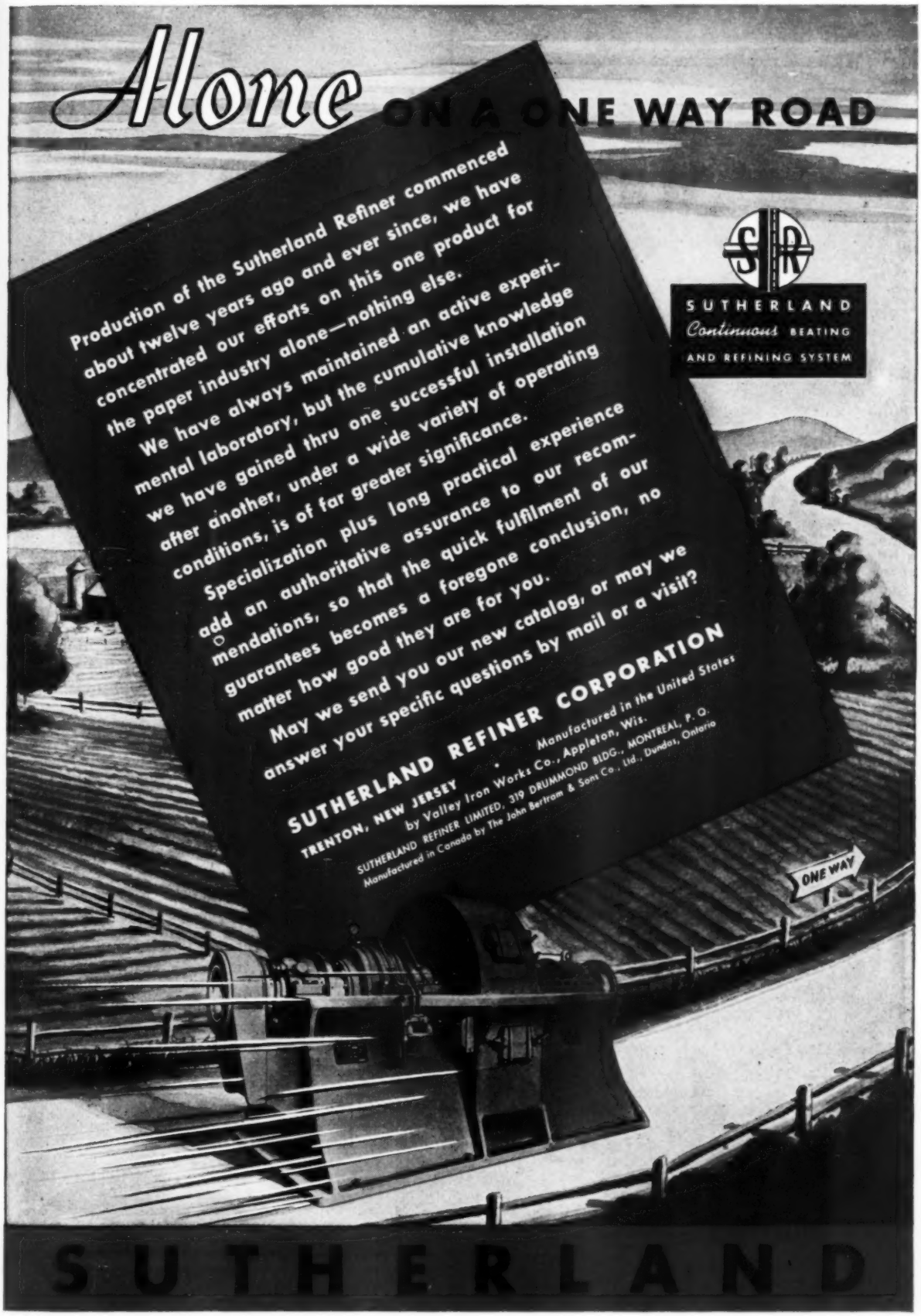
Alone
ON A ONE WAY ROAD
Production of the Sutherland Refiner commenced about twelve years ago and ever since, we have concentrated our efforts on this one product for the paper industry alone—nothing else.
We have always maintained an active experimental laboratory, but the cumulative knowledge we have gained thru one successful installation after another, under a wide variety of operating conditions, is of far greater significance.
Specialization plus long practical experience add an authoritative assurance to our recommendations, so that the quick fulfilment of our guarantees becomes a foregone conclusion, no matter how good they are for you.
May we send you our new catalog, or may we answer your specific questions by mail or a visit?
SUTHERLAND REFINER CORPORATION
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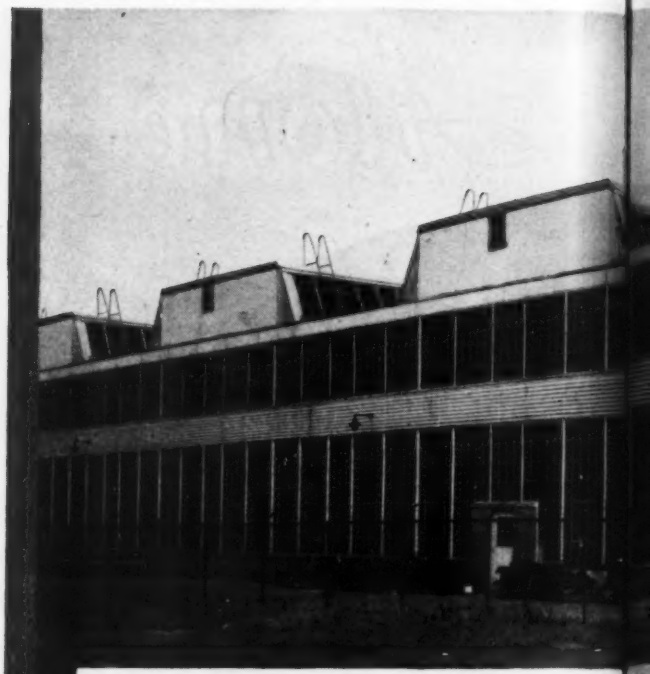
SUTHERLAND REFINER LIMITED, 319 DRUMMOND BLDG., MONTREAL, P. Q.
Manufactured in Canada by The John Bertram & Sons Co., Ltd., Dundas, Ontario
SUTHERLAND
Continuous BEATING
AND REFINING SYSTEM
ONE WAY
SUTHERLAND

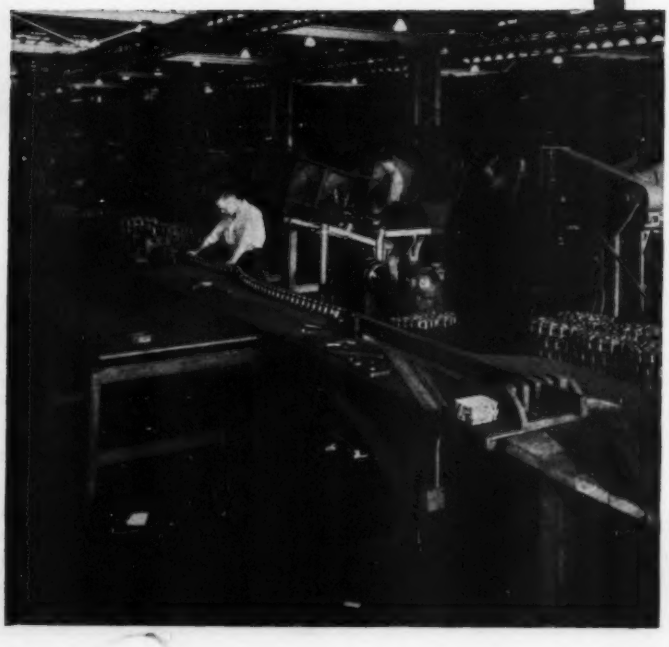
we're doing something about it!



. . . in fact, we're doing a lot about the long delivery situation on vitally needed pulp mill chains. For example, here are just a few of the things we *have done . . . and are doing* . . . to make more and more chain available to keep up with the vastly increased demand.

A NEW REX CHAIN PLANT . . .

the most modern in the industry. Through the addition of our new chain plant, equipped with the most up-to-date high speed equipment, we have been able to greatly increase our productive capacity.



BETTER PRODUCTION METHODS

Our new plant, plus modern assembly line production methods, is another step toward our goal of more chain for you. The illustration at the left shows our H-78 Chain assembly line . . . a new development which has not only doubled our production but has improved the quality of the chain. Uniformity of product is insured, and the method allows for closer inspection and testing.

CHAIN BELT
REX
COMPANY

STANDARDIZATION . . .

To assure better service to you, the Rex Chain Line has been standardized. Through the elimination of many duplicate and overlapping product items, we have been able to increase production to assure better availability *without affecting the completeness of the Rex Line for all applications.* By specifying standard Rex Chains, you can simplify your inventory and replacement problems as well as speed deliveries.

These are but a few of the many steps we have taken to give you better service. *We are doing something about it!* For all the facts on the Rex Line of Pulp Mill Chains, call your Rex Field Office or write Chain Belt Company, 1714 West Bruce Street, Milwaukee 4, Wis.

Rex H Type Drive Chains | Rex H Type Conveyor Chains | Rex Durobar and Combination Chains | Rex Chabelco Steel Chains | Rex Drop Forge Chains | Rex Barking Drum Chains | Rex Log Haul and Conveyor Chains | Baldwin-Rex Roller Chains

. . . DRIVE AND CONVEYOR CHAINS

Model "E" Undercut showing safety control levers under table, push button controls, and illuminated index tape. (Gear guards removed)

It's NEW Straight thru!

The

SMITH & WINCHESTER MODEL "E" UNDERCUT TRIMMER

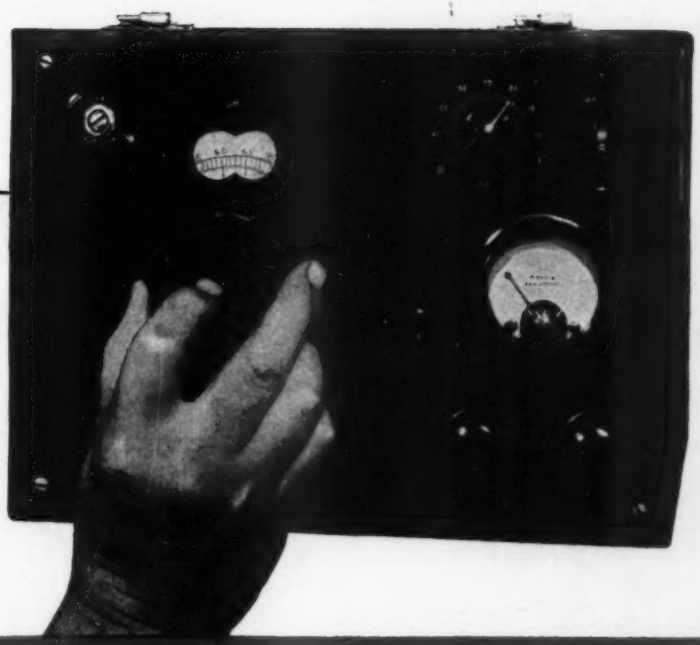
A NEW Smith & Winchester Undercut Trimmer from the ground up, to meet the exacting requirements of the modern finishing room for a fast, accurate Trimmer, safe in operation, accurate, and capable of high volume production. The Trimmer is one of the most important cogs in the production line of the paper mill. Work spoiled at the trimmer is work nearly completed and the cost of spoilage resulting from inaccurate trimming would be prohibitive. Look to the new Smith & Winchester Model "E" Undercut to completely satisfy your trimming needs. Bulletin giving full particulars mailed on request.

- Heavy one-piece base frame
- Anti-friction bearings on drive shaft
- Disc type friction clutch
- Back gauge operated by variable speed, reversible motor for accurate setting
- Push button control
- Illuminated index tape
- Gears properly guarded

Serving the Paper Industry Since 1828

The SMITH & WINCHESTER Manufacturing Company
SO. WINDHAM, CONN.

pH control



In the manufacture of fine paper, exacting pH control of the stock is vital to successful results. That is why only dependable chemicals of consistent uniformity and purity should be used. For alum and other paper-making chemicals that you can rely upon throughout your operations—

SPECIFY "GENERAL CHEMICAL"

ALUMINUM SULFATE

Standard—Ground, 99% thru 8 mesh, 95% thru 10 mesh; Powdered, 95% thru 100 mesh; also Lump.

Iron Free—Ground, thru 8 mesh; also Lump, approximately 2½"

SODIUM SILICATE

Solutions: From 38° to 60° Baumé — Wt. Ratio (Na_2O to SiO_2) from 1:2.00-1:3.40

Appearance: Opalescent to clear.

GENERAL CHEMICAL products for the paper industry

- Aluminum Sulfate, *Standard and Iron Free*
- Muriatic Acid *(Hydrochloric)*
- Sodium Fluoride
- Sodium Silicate
- Sodium Metasilicate
- Glauber's Salt, *Crystal and Anhydrous*
- Salt Cake
- Sodium Sulfide
- Sodium Hyposulfite
- Sodium Sulfite, *Anhydrous*
- Sodium Bisulfite, *Anhydrous*
- Disodium Phosphate
- Trisodium Phosphate
- Tetrasodium Pyrophosphate
- Sulfuric Acid
- Nitre Cake *(Sodium Bisulfate)*
- Nitric Acid
- Chrome Alum
- Aqua Ammonia

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ALLIED CHEMICAL & DYE CORPORATION
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BASIC CHEMICALS
FOR AMERICAN INDUSTRY

Northern Regional Research Laboratory

New and improved methods for the utilization of agricultural by-products are being developed in this modern research center maintained by the U. S. Department of Agriculture in Peoria, Illinois.

TRADE WINDS

Improved Process for Utilization of Straw

▶▶▶ A PROCESS FOR producing fine paper pulp from wheat straw at lower chemical costs and in significantly higher yields than previously thought possible, has been perfected after several years of study. On February 24, Dr. L. B. Howard, chief, the Bureau of Agricultural and Industrial Chemistry, U.S. Department of Agriculture, announced that this process has been developed at the Agricultural Residue Division of the Department's Northern Regional Research Laboratory at Peoria, Illinois; the announcement was made just following the presentation of two papers before the Technical Association in New York by members of the Laboratory's research staff (See p. 1792).

The announcement points out that when it is considered 95 million tons of wheat straw was grown last year and that the 40 million tons of straw burned and wasted would have been sufficient to produce 20 million tons of cellulose pulp, this country's entire requirement, the implications of this work are apparent.

The fact that straw has not been used in this country for making fine papers is due both to economic and technological limitations. The Peoria process produces yields of 50 per cent of screened, bleached pulp. This is 5 to 10 per cent higher than other processes operating on straw or most processes using wood. The cost of procuring clean straw has been a stumbling block in the past. Members of the strawboard industry and manufacturers of farm equipment have met at the Peoria Laboratory to perfect better methods and means for securing clean dry straw at lower costs. Co-operative studies have also been undertaken jointly by the strawboard industry, chemical fungicide manufacturers, and the Peoria Laboratory to cut down fiber losses in storage of straw and improve its quality. Real progress in economic procurement and preservation of straw has resulted.

Dr. E. C. Lathrop and S. I. Aronovsky, who direct these studies, have had considerable industrial experience in the paper industry. They do not recommend this straw pulp for use alone in making papers. The properties of this pulp seem unique; the pulp tests better in physical properties than soda pulps from any of the hardwoods and is the equal, excepting in tearing strength, of softwood sulphite pulps. The pulp is excellent for producing well formed papers, and hydrates easily. These engineers, therefore, believe that this fine pulp should find its logical use as a blend with any of several different kinds of wood pulp to produce fine papers, such as magazine, book, writing, litho, offset, certain grades of waxing tag, bristol, and other specialties.

The process is now ready for mill-scale trials. The technological soundness of this process is demonstrated by the fact that Dutch paper engineers, to whom this process was suggested, are using it successfully on a commercial scale in Holland, where straw is the main raw material for paper.

Paper and paperboard are in short supply and prices of these products have risen sharply. This is due to the short supply of pulpwood; pulpwood species are being used faster than grown; and Canada is drastically limiting pulpwood exports to the United States. About 25 mills in the Middle West produce annually 500,000 tons of strawboard for the container industry from wheat straw. For years European countries have produced fine papers, such as book and writing, from wheat and rye straw. England used a considerable amount of straw for fine paper during the recent war, while most of the South American Republics make their papers from straw.

A number of domestic paper companies are expressing some interest in the process. Dr. Howard says that the Bureau and the Northern Laboratory stand ready to assist industry in any way in the use of straw as a pulp source. More work may be required to make straw fully competitive with pulpwood. It is produced every year in almost all regions; it is a valuable and yet a largely wasted national resource. The co-operation of industry, the farmer, and the agricultural engineers is needed to help solve this national problem.

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FINANCIAL

▶▶▶ PAPER MILL SECURITIES in the past month have followed the general commodity and stock markets downward, though the lower prices in most cases have been only fractionally lower, or not more than a point or two, below those of a month ago. There may be food for thought that whenever prices are falling, trading in paper securities drops off, indicating an over-all bullish rather than a bearish attitude among investors in these industrials.

Chesapeake Corporation—Net in-

come for 1947 was $3,337,487 as compared with $1,437,747 in 1946.

Crown-Zellerbach Corporation—Net income for nine months ended January 31 was $14,170,634 as against $9,780,540 for the same period a year ago.

Fraser Companies, Ltd.—Net income for twelve months ended December 31 was $3,981,356 as against $1,964,061 for the preceding year.

Keyes Fibre Company—Net income for 1947 was $759,394 as against $332,853 in 1946.

Kimberly-Clark Corporation—Net income for the year ended December 31 was $7,074,012 as compared with $4,267,415 in 1946.

Marathon Corporation—Consolidated net earnings of the corporation and its subsidiaries for the first quarter ended January 31 were $1,212,840 as against $1,130,837 for the same period a year ago.

Oxford Paper Company—Net earnings for the year ended December 31 were $2,990,906 as against $1,842,545 a year ago.

Puget Sound Pulp & Timber Company—Net income for the year ended December 31 was $4,822,901 as against $1,320,507 a year ago.

Rhinelander Paper Company—Net earnings for the year ended September 30 were $1,310,216 as against $782,511, for the preceding fiscal year.

Sutherland Paper Company—Net income for the year 1947 was $2,364,114 as against $1,610,636 in 1946.

Union Bag & Paper Corporation—Net earnings for year ended December 31 were $11,756,608 as compared with $5,254,953 a year ago.

United Board & Carton Corporation—Net earnings for twelve weeks ended February 7 were $188,685 as against $436,942 for the similar period a year ago.

United Wallpaper, Inc.—Net income for six months ended December 31 was $232,196 as against $1,026,277 a year ago.

S. D. Warren Company—Net income for the year 1947 was $2,190,794 as against $1,597,370 in 1946.

West Virginia Pulp and Paper Company—Net income for three months ended January 31 was $2,470,229 as against $2,373,024 for the same quarter a year ago.

Paper Mill Corporate Changes

Paraffine Companies—A privately placed loan of $12,500,000 in fifteen-year 3 per cent sinking fund notes will be used to help finance plant expansion on the Pacific Coast and a new floor covering plant in New Jersey.

St. Croix Paper Company—A group of newspaper publishers has been given 90 days to obtain 24,822 shares of St. Croix stock. All but 3 per cent of the company's stock has been deposited under a buying contract which would give the new purchasers the 80,000-ton mill and some 600,000 acres of timberland.

Union Bag & Paper Company—The Chicago plant of Corrugated Containers, Inc., has been purchased to supply midwest customers of the bag company.

New York Stock Exchange—Stocks

	Closing Prices Feb. 25	Jan. 26
A.P.W. Products	*4⅛-4½	*4⅛-5
Celotex	23¾	24
Same Preferred	*19-19¼	20
Certain-teed Products	14⅝	15⅛
Champion P & F Co.	19	19⅛
Same Preferred	93	*98-100
Container Corp.	36	40¼
Same Preferred	*91½-94¼	95¼
Continental Diamond.	*10¼-10⅝	10⅞
Crown Zellerbach	28⅝	28⅝
Same Preferred	*91-92½	94
Same $4 Preferred	106⅞	111½
Dixie Vortex	31¾	37
Same "A"	49½	50
Robert Gair	8⅝	7⅜
Same Preferred	19	19
International Paper	46¼	47
Same Preferred	*87-89	91
Kimberly-Clark	20¼	21
Same Preferred	92½	98½
McAndrews & Forbes.	*36⅛-37	37
Marathon	19½	22¾
Masonite	48½	55
Mead Corp.	16¾	19
Same Preferred	88	*91-93
Same 2nd Preferred.	*36-38	40
National Container	12	12⅝
Paraffine Cos. (New).	22½	....
Same Preferred	*99-103	100
Rayonier, Inc.	24	23½
Same Preferred	31⅜	32½
Scott Paper	42	43
Same Preferred	*90⅛-92⅞	94½
St. Regis	8½	9⅛
Same Preferred	*79-80½	*80-81
Sutherland Paper	39	39
Union Bag & Paper	29⅞	30¼
United Bd. & Carton.	12½	13¾
U. S. Gypsum	97½	95½
Same Preferred	*173-175	*169-170
U. S. Wallpaper	4⅛	5⅛
Same Preferred	*30-33½	*30-31
West Va. P & P Co.	39¼	42
Same Preferred	100½	*100-102

New York Stock Exchange—Bonds

Celotex 3½%	99⅛	99½
Champion P & F Co.	....	....

New York Curb Exchange—Stocks

Am. Writing	....	8¼
Great Northern	41	42
Taggart	10½	10½

*Closing Bid and Asked Prices.

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BRITISH PAPER NOTES
(January, 1948)

The first few days of the New Year brought an all-round increase in prices to the British Paper Trade. Newsprint advanced by a further £9 per ton. Thus the present price for British produced newsprint on reels, machine finished, now stands at £46-10-0 per ton, an advance of no less than £16-2-6 over the past six months or, approximately four times the 1939 price.

Another unfortunate feature of the newsprint section is that home production from January 1 was reduced to 20 per cent of prewar capacity owing to lower imports of the necessary pulp from Scandinavia. Since the end of the war in Europe, production has been moved up from the wartime 18 per cent to 33-1/3 per cent; consequently the present production is little more than half what it has been over the past year and a half. The effect of this reduced production on current stocks can be appreciated, and at one time it was expected that newspaper sizes would also have to be cut from the present standard four pages. This prospect coupled with the substantial increase in price would have had a crippling effect on newspapers. Happily for the first half of 1948 at least, newspapers are to remain at their present size and optimistically it is hoped that by mid-year production will again be stepped up. As a move towards maintaining the newspaper position throughout the whole of 1948, the Government has given permission for imports during the second half of the year to be at the same level as during the first half, namely 52,500 tons; moreover, an authorization to purchase a further 20,000 tons from Scandinavia, if available, has been given. The hope has been expressed by F. P. Bishop (general manager of the Newsprint Supply Company, Ltd.) that production may be moved up to 22½ per cent during the next license period which begins in March. On top of this an intensified effort is to be made to increase the salvage of wastepaper by an additional 100,000 tons during the next six months. This extra quantity together with the present rate of collection should be sufficient to help newsprint as well as board mills and those mills making wrapping papers for export.

Among other qualities of papers the mechanical wood pulp grades have advanced from £3-17-6 to £6 per ton according to percentage of pure pulp in furnish. This advance affects a considerable number of the cheaper periodicals some of which have already advanced their sale prices to the public. Pure wood quality papers are up by £8 per ton and the esparto/straw grades by £2-17-6. Similarly Massy produced coated papers have a price addition ranging from £1-5-0 to £6-12-6 according to body material. Finally, poster papers are up by as much as £8-15-0 per ton.

Despite these higher prices, which in some cases presents an over-all increase of nearly £20 per ton during the past six months, there is no letup in paper demand. Although the first reaction revealed certain patchiness, this soon passed and a return to "normal" demand has been noted over the past few days.

Unhappily the Trade is arriving near the end of the present license period, and already there appears to be a general acceptance that quotas will again be cut for the new period.

PAPER · · · America's 6th Industry

CENTENNIAL SPOTLIGHT 1848-1948
In this 100th anniversary year as Machine Builders for the Paper Industry, Puseyjones points with pride to outstanding post-war installations. In the spotlight . . . 234" Fourdrinier Machine built for: Hudson Paper Company, Palatka, Florida.

"SEE THROUGH" SHIPPING BAGS

(NEWS ITEM: *A new paper bag has been designed for prepacking bulk fruit and fresh vegetables at the shipping point.*)

From the sunny groves of Florida to the frozen shores of Maine, fresh fruit travels in a new type paper bag. Made of two or more layers of wet-strength kraft paper, this new bag features a "window" of cotton mesh. If desired, bags are made with a specially treated, creped kraft handle. This new paper container combines all the advantages of product protection—visibility, air circulation and brand identification. Manufacturer's name supplied on request.

Paper soap tissues . . . steam pressing paper . . . silver polishing paper . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines. Additional capacity in Metals Fabrication is now available through conversion of facilities formerly devoted to the building of ships.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

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Established 1848. Builders of Paper-Making Machinery
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THE SIGN OF TRADE MARK SUPERIOR QUALITY

The reason for this is not hard to discover when the Board of Trade Returns covering the past year are studied. Here it is seen that although paper-making material imports reached 1,064,808 tons, an increase of 115,000 tons on the previous year this additional tonnage is entirely due to esparto grass and rags for the imports of wood pulp are lower by over 47,000 tons. Material imports for 1947 represent only 54 per cent of prewar and it is seen that while Finland sent an additional 23,000 tons (over 1946) and Norway 8,000 tons, Sweden's contribution was 100,000 tons down.

Imports of paper and boards during 1947 (496,581 tons) reached 46 per cent of 1938, and although higher than in the previous year, the extra was mainly wrapping papers and boards. Incidentally newsprint imports increased by 18,000 tons despite expectations to the contrary and receipts from Sweden were up by 20,000 tons. Even exports from the United States to the British market moved from 4,497. to 24,989 tons.

Another surprising feature was the exports of paper and boards which although retarded by the coal crisis and other difficulties managed to reach 111,949 tons in 1947, only about 2,000 tons down on the previous year. Exports to the United States were slightly better in 1947 than in 1946.

FIRE DESTROYS $200,000 STOCK PILE OF PULPWOOD AT NOTHERN PAPER MILLS

A ravaging fire destroyed a huge stock pile of spruce pulpwood at the Northern Paper Mills, Green Bay, Wisconsin, on February 28. The loss was estimated at $200,000 by A. B. Hansen, president and general manager. Although the property was covered by insurance, it is unlikely the wood can be replaced, because of the curtailment of shipments of spruce from Canada.

The fire was discovered by the watchman shortly after midnight and by the time the fire department could be summoned, the entire stock pile was ablaze. As the firemen attempted to play floods of water into the center of the burning piles, avalanches of blazing logs slid into the narrow fire lanes between the stock piles and constant showers of embers threatened adjoining piles.

Two of the company's steam cranes were placed into service as emergency water towers. Firemen clung to the top of the booms pouring water into the flames from above. Flames were leaping 50 feet into the air and were visible throughout Green Bay. Logs soon

These pictures of the Great Northern pulpwood fire were taken by Lefebvre-Luebke Studio, Green Bay, Wis.

1948

Double-strand Jeffrey PW 132 Chain with S-212 Spurs (both patented), designed especially for log handling, provide a wide conveyor for large capacities and grab loading. Condition pictured requires heavy chain and non-breakable spurs. Note in the close-up, the ruggedness of the formed steel S-212 Spurs.

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became coated with ice as the streams of water condensed into steam, making it difficult to attack the source of fire in the center of the stock pile.

In addition to the city fire equipment and the mill's own fire brigade, a volunteer fire-fighting crew from Hoberg Paper Mills, which is adjacent to the Northern plant, furnished auxiliary equipment and hose. About 8,000 gallons of water a minute were pumped into the burning pulpwood pile during the thirty-six hour battle.

The fire was of an undetermined origin, according to Mr. Hansen. He pointed out that investigation disproved a report that one of the steam cranes had dumped a fire in the yard shortly before midnight. The theory of spontaneous combustion was also discounted by him with the explanation that it is unlikely to occur in pulpwood stacks unless oily rags or similar inflammable material is present. Constant patrols of the stock piles were maintained at night, he said, and there was no indication of incendiarism.

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MANDO AWARDS LARGEST SINGLE PAYMENT UNDER ITS SUGGESTION SYSTEM

The largest single payment under the suggestion system initiated in 1945 by the Minnesota and Ontario Paper Company, Minneapolis, was accorded recently to a Mando employee. The $500 award was made to Fred Lahaie, machinist at the National Pole and Treating Plant division of Mando, for an idea which is expected to save the company about $5,000 annually in shutdown and replacement costs.

A veteran of twenty-six years service with the company, Mr. Lahaie developed an improved type flexible knuckle joint used in association with the multiple drills boring a series of spike holes in railroad ties. Although the life of the knuckle joint previously used was two months, the improved joint which was experimentally installed five months ago has yet to be replaced.

Prior to the installation of the Mando Suggestion System, Mr. Lahaie had developed a pneumatic car starter and an idea for a tie hold-down device which since has been adopted by a majority of tie processing companies.

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FORESTRY INCREASING REPORTS N. Y. STATE COLLEGE OF FORESTRY

According to a statement issued by The New York State College of Forestry at Syracuse University (Syracuse, N. Y.), forestry in this country is on the upward swing.

"The U. S. Forest Service investigations show that the drain on our forests generally has been decreasing and new growth has been increasing. The scales are not yet balanced, especially in the growth of saw timber, but in the foreseeable future, if future trends continue, our forest resources will meet optional requirements."

The College says that the over-all drain on timber has dropped about 50 per cent since 1918, and growth has increased nearly 300 per cent. Losses by fire have been cut approximately one half. Losses by insects, disease, and storm, show a decrease since 1936. Before that year, losses from these causes were increasing.

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COTTON ACREAGE IN TEXAS TO BE INCREASED FOR USE IN 28 RAG CONTENT MILLS

Convinced by its 1947 experimental program that the growth of cotton specifically for the paper industry is economically sound, a group of twenty-eight rag content mills are planning to increase the experimental acreage from 200 to 1200 this year.

The 1947 program has confirmed the belief that such cotton can be delivered to mills at a price conservatively estimated at eight cents a pound, according to M. C. Dobrow, executive secretary of the Writing Paper Manufacturers' Association.

The Texas Fibre Institute, formed by the twenty-eight mills and supported by them, rented 200 acres in the Texas Panhandle, purchased modern planting and harvesting equipment and produced a crop which was put through the ginning process with special attention to its use for papermaking. The low grade cotton which can be raised in the Panhandle was found to answer the needs of rag content mills that have been using higher grade cotton and cotton linters as substitutes for rags.

The 1947 yield was too small to distribute among the mills, but approximately 1,000 bales which are expected to be harvested in 1948 are to be distributed. It is hoped that in the third year of operation the project will be on a commercial basis. It also is believed that the delivered cost of the Panhandle cotton will be further reduced by a special low-grade commodity rate on the railroads.

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IMPORT NOTES

The devaluation of the French franc for the purpose of increasing the available supply of dollars in France will have repercussions on all grades of paper which can be shipped from that country, according to a report by Warren B. Bullock, manager of the Import Committee of the American Paper Industry. By the devaluation, such papers as are made in France can be sold at about half the present prices, at least until the export and the home use franc values come closer to each other. The prospect is that some French export prices will rise. The United States Tariff Act, however, may be used to apply extra duties on French

Fred Lahaie, Mando award winner, points out the advantages of this new type joint to H. F. Woodward, Mando patent attorney, while L. C. Brooks, plant manager looks on

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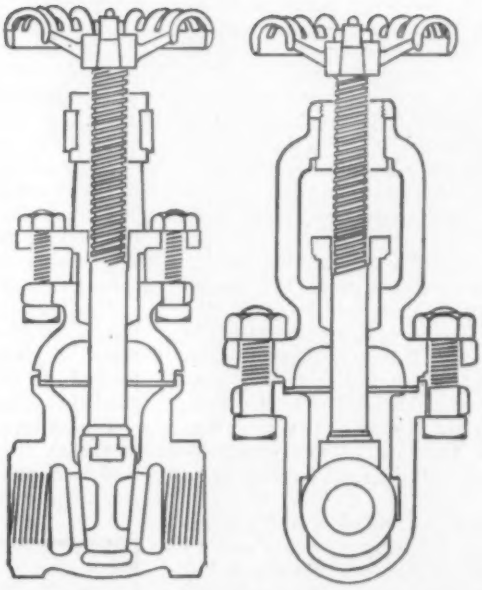
Screwed end sizes available from ½" to 2". Type 304 stainless steel and flanged end available upon request.



*The letter "S" after the numerals designating the chromium and nickel content in OIC Stainless Steel Valves denotes that the carbon content is less than 7/100 of 1%. This is an important factor, as the degree of corrosion-resistance is greatly influenced by the carbon content. Its presence must be limited to the lowest possible percentage. In "S" alloys, this minimum is achieved.

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merchandise. The law provides that duties shall be computed on the price in the country of origin and this would seem to be the value in the home use franc. With the possibility that there may be two other standards for the valuation of the franc, the official market and a free market which is also authorized, the complications in computing duty rates will be increased. Normally, duties are computed on the basis of the official value of currency on the date of export, but the manner in which the new French government regulations are phrased will determine the procedure of the American Bureau of Customs.

A bill has been introduced in Congress to extend for two years the provision of the amendment to the Tariff Act by which paper in rolls under 15 inches in width will be duty free as standard newsprint paper. The amendment passed last year provided that paper of standard newsprint quality in rolls from 15 to 9 inches in width could be imported duty free as standard newsprint until July 1, 1948. The original provision was rushed through Congress without an opportunity for the domestic industry to be heard.

Bible paper from England assessed for duty at 5 cents per pound and 15 per cent, claimed to be dutiable at 7½ per cent, has been held by the United States Customs Court to be bible paper weighing over 10 pounds per ream, dutiable at 2 cents per pound and 20 per cent.

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BADGER GLOBE FOREMAN'S CLUB OF KIMBERLY-CLARK HOLDS DINNER MEETING

The Badger Globe Foreman's Club of Kimberly-Clark Corporation (Neenah, Wis.) heard an address on some general aspects of a public relations program at a dinner meeting, February 9, at Hotel Menasha. The talk was given by M. J. Schulenberg, assistant to President C. G. Parker, of Kimberly-Clark.

The newly elected officers of the club, who sponsored the meeting, are: William Herriott, president; Harry Nelson, vice president; Kenneth Buesing, secretary; and Norbert Hecker, treasurer.

The second half of a training program sponsored by the Foreman's Club has been resumed and will be completed in April.

▼

NEW WOOD PREPARATION EQUIPMENT INSTALLED AT MANISTIQUE PAPER CO.

The Manistique Pulp & Paper Company, of Manistique, Michigan, recently completed and placed in operation a new wood preparation department. The project includes a brick building 80 by 70 feet in size and 30 feet high with structural steel frame. The equipment consists of a 10 by 30 foot barking drum and a new 12 by 45 foot barking drum, complete with steel conveyors, and also a bark press.

The log pond has also been completely rebuilt and lined with concrete walls. A slasher building, also incorporated in this project, contains a parallel log haul-up and slasher.

The conveyors consist of log haul-up to slasher, from slasher to drum, log haul-up to pulp mill, bark and sawdust conveyors to the boiler room and recirculating conveyors. All conveyors are made of steel and all wood construction has been entirely eliminated.

▼

LOW GRADE COTTON AGAIN SUBSIDIZED TO PAPER MILLS

The Department of Agriculture has renewed its program for selling low grade cotton to paper mills under a subsidy program by which 10,000,000 pounds can be purchased at 2 cents per pound. The revised program supplants that expiring last September, and involves only one fifth of the amount made available previously, and the price half that formerly imposed.

Washington officials are watching closely the developments abroad which by tariff accords are helping in the development of the Marshall plan. A Customs union of Belgium Netherlands and Luxembourg is an accomplished fact and official steps have been taken by France and Italy for a comparable union.

U. S. Senator Alexander Wiley, of Wisconsin, has disclosed a protest which he has made to the Premier of Ontario against the program to progressively embargo export of Ontario wood to United States mills. Senator Wiley said that exports to mills not having plants in the province will expire in three years, and meanwhile the amount of pulpwood permitted them will be progressively decreased. Senator Wiley told Premier Drew that his program would cause widespread curtailment of production in Wisconsin.

Senator Capehart, reporting for the United States Senate Small Business

A dinner meeting of the Badger Globe Foreman's Club of Kimberly-Clark Corporation was held under the leadership of the newly-elected officers of the club. Left to right—(seated) Kenneth Buesing, secretary; William Herriott, president; Harry Nelson, vice president; Norbert Hecker, treasurer; (standing) Phil Gaertner, board member; Ed Miller, past president; Sylvester Demerath, board member

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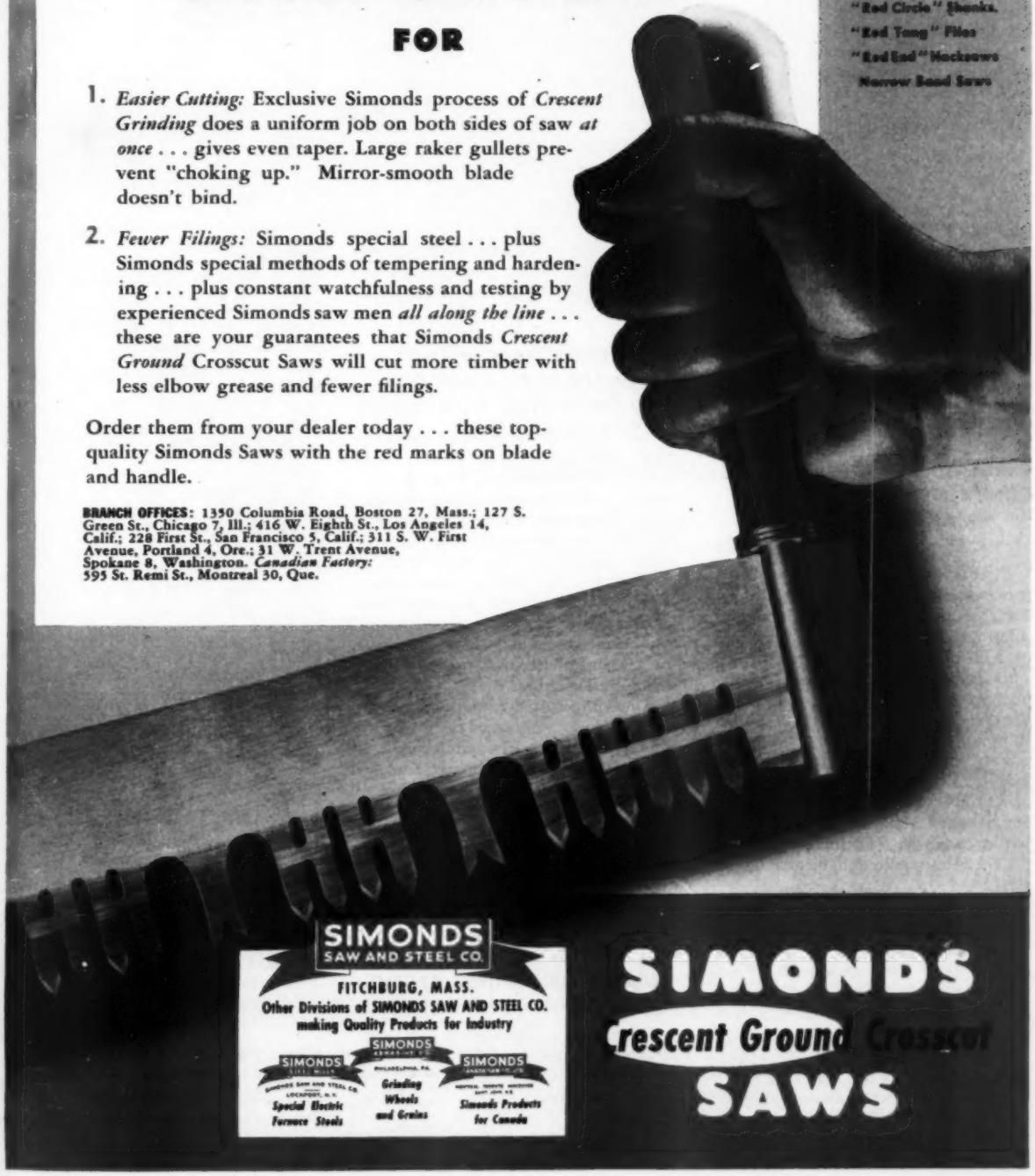

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SAWS

Committee suggested that proposed timber contracts in the Alaskan forests for the production of pulp and paper specify that the wood shall be used in the manufacture of newsprint. It was suggested that co-operative enterprises be formed by publishers to finance one or more newsprint mills in Alaska.

Various paper manufacturing associations have filed briefs with the Committee for Reciprocity Information protesting against the recent Mexican action in sharply increasing the duty rates on papers shipped to that country. Mexico in December not only canceled its share of the reciprocal trade agreement with the United States but also raised duties, generally more than 35 per cent, on papers not mentioned in the earlier agreement. Kraft wrapping paper has been barred from Mexico since last July.

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DETROIT SULPHITE MILL NOT SOLD TO FRONTENAC CORP.

It was erroneously stated in a heading on Page 1564 of the February, 1948, issue that the Detroit Sulphite Company mill was sold to Frontenac Paper Corporation. The mill purchased by the Frontenac Corporation was the Dexter Sulphite Pulp & Paper Company, Dexter, New York.

▼

CONTAINER INSTITUTE MAKES SURVEY ON CARTON DAMAGE

The first step in an extensive research and educational program to reduce the sharply increased amount of shipping damage has been completed by The Shipping Container Institute. This initial nation-wide study, extending over 13 months, investigated the life-cycle of more than 700,000 fiber shipping containers.

Extending from May, 1946, through July, 1947, the survey studied a total of 711,808 containers, carried in 502 freight cars from coast to coast and border to border. Of these containers, 5,177 were reported damaged on arrival.

Early results of this study indicate that a major share of the responsibility for shipping damage must go to the shippers and their personnel. Findings bear out that faulty, careless loading practices are a main cause of damage.

The study of the life-cycle of shipping containers is the first step in the Shipping Container Institute's program of conducting fundamental research in the field of fiber shipping containers. The Institute's program fills a long-existing need for a technical and research center in the fiber shipping container industry.

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EDMONTON SITES EXAMINED FOR PROPOSED PAPER MILL

Representatives of Eastern Canadian interests are investigating the selection of a site in Edmonton, Alberta, for construction of a pulp and paper mill which ultimately will cost an estimated $14,000,000. Negotiations have been going on for some time, according to Land Minister N. E. Tanner.

Railway trackage will be one of the major considerations in determining the location. Promoters also are considering natural gas from the area as a source of power. This fuel is abundant in the region east of Edmonton.

The project was discussed with civic and provincial authorities by R. O. Sweezey of Montreal, founder of the Beauharnois Power Corporation.

Timber required by a mill would probably be obtained from Crown lands lease from the province. Spruce and jackpine would be utilized.

▼

ENGINEER-FORESTRY UNIT SPONSORED BY MANDO IN CO-OPERATION WITH ARMY

An Army affiliated Engineer-Forestry Battalion, Headquarters and Headquarters Company is to be organized and located at International Falls, Minnesota, under the sponsorship of the Minnesota and Ontario Paper Company. The unit will be headquarters for similar units organized in other bordering states and will be organized under the supervision of the Minnesota state senior instructor for Organized Reserves, Colonel Raymond R. Tourtillott.

According to a previous announcement, Mando employees belonging to military reserve organizations will be granted two weeks leave per year for training purposes without impairing their other vacation benefits. It also is the policy of the company to make up the difference between the employee's regular two weeks earnings and that which he receives from his military organization.

▼

INLAND CONTAINER BEGINS PRODUCTION AT MACON MILL

Production of corrugated containers has been started by Inland Container Corporation, Indianapolis, in its recently completed plant in Macon, Georgia.

The new plant is located adjacent to the new Macon Kraft Company paper mill, in which Inland Container Corporation and the Mead Corporation have joint interests. Pulpwood cut in the vicinity of Macon will be utilized at the Macon Kraft mill in the manufacture of kraft paperboard to be used by Inland in its corrugated fiber shipping containers.

The most modern design was used in the new plant which consists of one-floor construction with brick walls, steel sash and steel trusses. It is equipped with a sprinkler system, is fireproof throughout, and has ample light and ventilation for excellent working conditions. The Inland company will employ 400 persons in its new plant.

▶▶▶ LEGAL NOTICE OF intention to apply for water rights on the Nanaimo River in British Columbia has been published in the *Nanaimo Free Press* by the H. R. MacMillan Company, indicating that this area may have been chosen as the site of the company's new $12,000,000 pulp plant (Cf. P.I. and P.W., Feb., 1948, p. 1566). Advertisements indicated reserve of 20,000 acres at first Nanaimo Lake for a dam site, and a 100 cubic feet per second intake in Nanaimo River canyon.

▼

▶▶▶ A SHIPMENT OF pulpwood from along the Grand and Missouri Rivers near Brunswick, Missouri, has been started by the Mead Corporation, of Chillicothe, Ohio. A company representative recently made a survey of the pulpwood timber along the rivers and reported that a large amount was available for harvesting between Glasgow and Camden.

▼

▶▶▶ THE PURCHASE OF more than 4,000 acres of land in Florida by the St. Joe Paper Company, Port St. Joe, Florida, has been recorded. The reported consideration of the transaction is $50,000. The land is cutover woodland and undeveloped. It is understood that the company is negotiating for the purchase of other lands in the state.

▼

▶▶▶ TWENTY VETERAN employees of the Kenora, Ontario, mill of the Minnesota and Ontario Paper Company were presented gold signet rings symbolic of twenty-five years service at a dinner celebrating

the Zephyrweld LINE IS COMPLETE!

from 1" thru 24" O.D.

...as well as REDUCERS and ADAPTERS for use with practically all other fitting types

...A FULL RANGE OF STAINLESS STEEL WELDING FITTINGS FOR PERMANENT CORROSION-RESISTANT CONVEYING LINES

Tri-Clover now offers the most complete line of *"Zephyrweld"* stainless steel welding fittings in sizes from 1" through 24" O. D., fabricated in gauges from 16 to 10, for use with stainless steel light gauge O. D. tubing, in permanent installations where liquid conveying lines require positive protection against corrosion.

Employing modern, unique and proved methods throughout, the new *"Zephyrweld"* porosity-free fittings are fabricated from three standard stainless steel types . . . 304, 347 and 316.

"Zephyrweld" fitting ends are cut flush for rapid welding. Because of their light gauge, no chamfering is required. Fittings can be flame cut for disassembly, used again by re-welding. *For better, lower cost corrosion-resistant conveying lines, see your Jobber, or write for complete catalog.*

FLANGED TYPE Conical End FITTINGS ALSO AVAILABLE— *for faster installation and disassembly of lines . . . fabricated from stainless steel type 316 for use with commercial tolerance light gauge tubing having outside diameters from 1" thru 10". Easily assembled with lightweight, high strength couplings, which provide an extremely compact, flush, leak-tight union for working pressures up to 250 psi. Complete line of ells, tees, crosses, adapters, etc. Write for catalog.*

Tri-Clover MACHINE CO.
Kenosha, Wisconsin.

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

THE Complete LINE

Stocks now carried by distibutors strategically located throughout the United States

the mill's twenty-fifth anniversary. Ring presentations have been made this year at other Mando plants to 103 employees attaining the 25-year status.

▼

▶▶▶ SIX MILLION DOLLARS has been borrowed by the Brunswick Pulp and Paper Company (Brunswick, Ga.) for expansion of production facilities and for repayment of an outstanding bank loan. The Brunswick company, which manufactures paper used by the Scott Paper Company and Mead Corporation, is owned jointly by the two concerns.

▶▶▶ PLASTIC BAGS will be manufactured in the new plant to be built at Lockport, New York, by the Dewey & Almy Chemical Company (Cambridge, Mass.). Present plans call for the employment of about one hundred persons before fall.

▼

▶▶▶ NEW MACHINERY in operation in the Port Edwards finishing department of Nekoosa-Edwards Paper Company (Port Edwards, Wis.) consists of a Hamblett paper cutter and a Seybold precision trimmer. The new cutter accommodates rolls up to 114 inches in width and replaces cutter No. 1 which has been dismantled. The trimmer has an improved type of broke return and is used primarily for trimming papers to be packed on skids.

▼

▶▶▶ A RETIREMENT PLAN inaugurated by the Rhinelander Paper Company (Rhinelander, Wis.) will cover all salaried employees. The entire cost of the plan is carried by the company. Past service costs are being funded over a twenty-five year period, during which time the annual payment for the number of employes presently affected amounts to $55,000. Employes are eligible for participation under the plan after fifteen years continuous employment with the company.

▼

▶▶▶ THE HOUSE COMMITTEE of Nekoosa-Edwards Paper Company (Port Edwards, Wis.) has announced the extension of a plan awarding cash grants of $300 to employees building homes for their own occupancy in Nekoosa or Port Edwards. The program was inaugurated in July, 1946. The company purchasing department also assists employees in every way possible in securing necessary building materials.

▼

▶▶▶ A RECENT PURCHASE of the Polson timber holdings on the Olympic Peninsula by Rayonier, Incorporated, has caused the transfer of its Olympia, Washington, offices to Hoquiam, Washington.

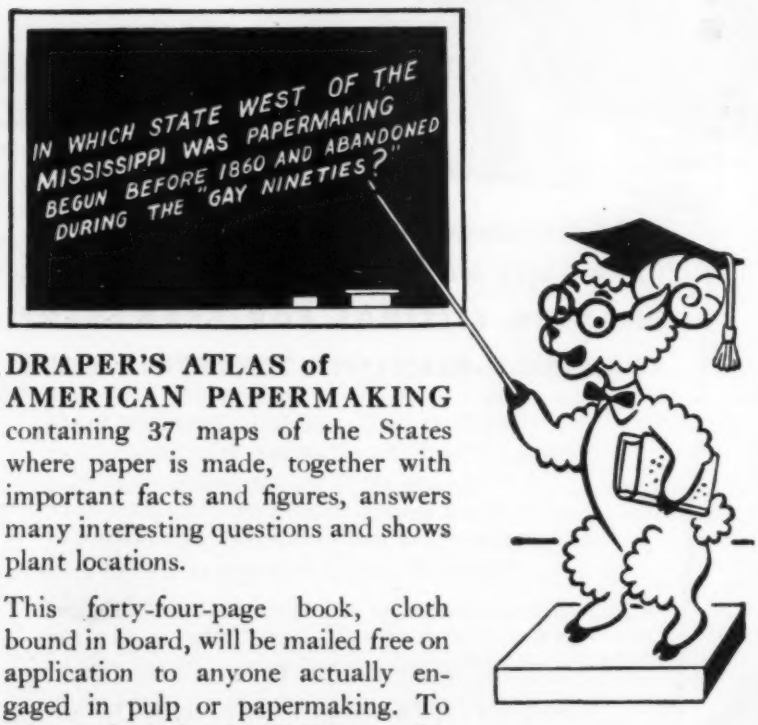
▼

▶▶▶ PLANTING AND RESEEDING of about 2,800 acres of cutover and burned-over timber land in Clatsop County, Oregon, is planned by the St. Helens Pulp and Paper Company, according to Bryce Hammack, resident forester at Astoria. The company owns about 50,000 acres in Clatsop and Tillamook Counties which it is operating as a single sustained yield unit.

▼

▶▶▶ A COLOR AND SOUND movie was shown recently by Linton Brothers and Company (Fitchburg, Mass.) to a group of paper salesmen in Chicago. Entitled "The Pulling Power of Bristol," the movie depicts the value of both index and printing bristol and suggests many new ideas for direct mail advertising. The 17-minute film currently is being shown to sales agents in the South. Reprints will then be made available to advertising and sales groups throughout the country, according to Roger Clapp, who represented the Linton company at the showing of the film.

What do you know about Paper?



DRAPER'S ATLAS of AMERICAN PAPERMAKING containing 37 maps of the States where paper is made, together with important facts and figures, answers many interesting questions and shows plant locations.

This forty-four-page book, cloth bound in board, will be mailed free on application to anyone actually engaged in pulp or papermaking. To others, the price is $2.00 postpaid, while the edition lasts.

The DRAPER Felt

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

Ralph E. Briggs, Sales Manager

BRADFORD WEST, Pittsfield, Mass. — WILLIAM N. CONNOR, Jr., Canton, Mass. — L. H. BREYFOGLE, Kalamazoo, Mich.

WALTER A. SALMONSON, 519-20 White Bldg., Seattle, Wash. — L. L. GRIFFITHS, Jr., Kalamazoo, Mich.

Answer to Question No. 3: In the State of Utah

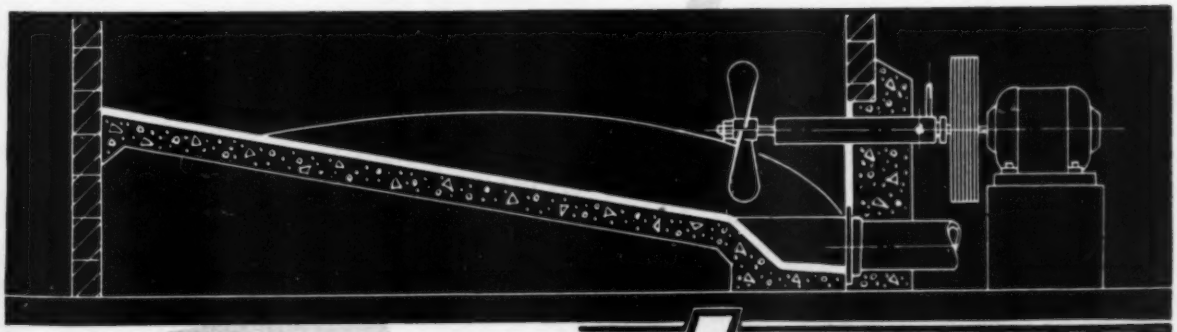
STOCK PREPARATION

New Jones AGITATOR

A "Packaged" Unit

Have you carefully checked your agitating equipment recently? And how about costs? Perhaps your old unit is "snitching" valuable dollars from your profits. Satisfy yourself. Investigate. What is its condition? Then compare the efficiency and economy advantages of the new Jones Agitator with your obsolete equipment. Several of the Jones Agitator features are: all non-corrosive stainless steel and bronze construction. Water-lubricated laminated plastic bearings. Anchored within stuff chest, it represents a compact, self-contained unit. Furnished with electric alarm system which sounds a warning if the water supply to the bearings should fail. Suitable for consistencies up to 4%. 7½ to 15 horsepower required. Available in different propeller sizes to suit the size of chest. Tell us your problem: whether you want a new Jones Agitator in your old chest . . . or need a new Jones modern chest to meet your requirements . . . or modernization of your old chest. We'll welcome your inquiry.

Only as good as the agitating it gets . . .



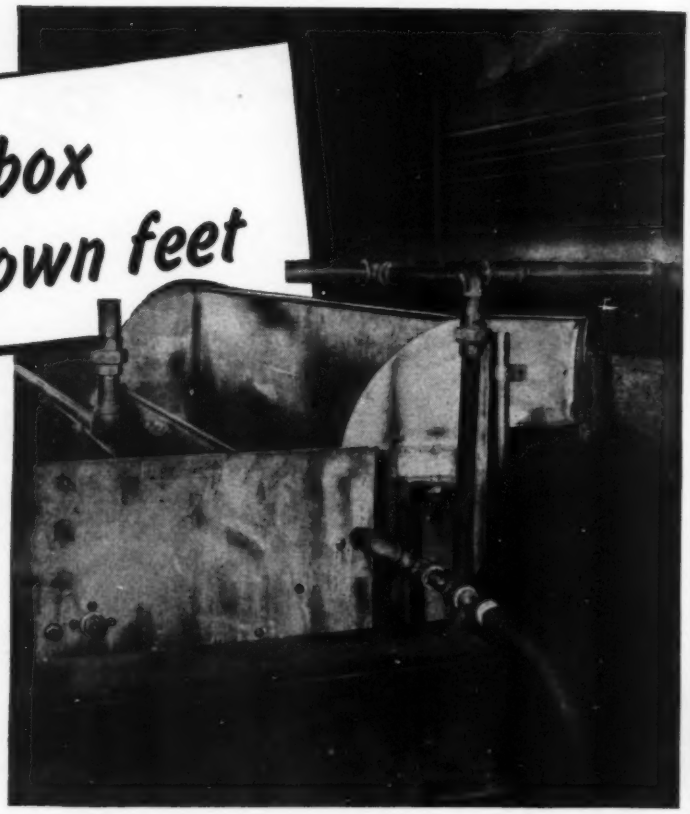
View showing JONES STUFF CHEST with AGITATOR in position

Jones

E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills

MANUFACTURERS AND DISTRIBUTORS IN CANADA: WATEROUS LTD., BRANTFORD, ONT.

This headbox stands on its own feet



MONEL HEADBOXES are now standard equipment for Fourdrinier wet ends at plant of The Crane Company, Dalton, Mass. *Fabrication and installation by The Berkshire Sheet Metal Works, Pittsfield, Mass.*

Entirely self-supporting, it's another example of Monel's many wet end uses

Headbox problems are few in The Crane Company's mill at Dalton, Mass.

For Crane has standardized on Monel.*

And Monel headboxes are installed in one piece. They're *self-supporting.* They stay tight and don't leak.

They have no wood joints to swell and spring out of place. They need no protective paint. No preservative of *any* kind.

Smooth . . . and easily cleaned

Monel is both stronger and tougher than mild steel. It resists corrosion by paper stocks and white waters. Its surfaces stay smooth, and never give slime and fibre accumulations a chance to dig in and hang on. That's why it's so easy to keep Monel headboxes slick and clean merely by rinsing them with a fresh water hose.

Readily fabricated

Monel presents no problems to experienced fabricators. They can do almost anything with it. For example, The Berkshire Sheet Metal Works, Pittsfield, Mass., cut, bent and welded this headbox by commonly used methods.

For other jobs too

Because Monel shows no galvanic reaction with copper or brass parts, it has many uses throughout the wet end. Specify it for save-all pans and trays, suction boxes, rods, rolls, rails, fastenings, doctors and slices, as well as for headboxes. Let Monel help make *all* your equipment long-lasting and trouble-free.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET, NEW YORK 5, N. Y.

MONEL

NICKEL (INCO) ALLOYS

MONEL* • "K" MONEL* • "R" MONEL* • "KR" MONEL* • "S" MONEL*
INCONEL* • NICKEL • "L" NICKEL* • "Z" NICKEL* *Reg. U. S. Pat. Off.

UNION PACIFIC

Industry is on the Move .... Westward

UNION PACIFIC RAILROAD COMPANY
OMAHA 2, NEBRASKA

G. F. ASHBY, PRESIDENT

To American Industry:

The Union Pacific West offers industry proximity to products of ranch, mine and forest...ample power, fuel, water...healthful living conditions in scenic, recreational regions...and native-born, high-type labor.

Our faith in the future of this vast territory is confirmed by our current 200-million-dollar investment program for new equipment, improved and expanded facilities to provide shippers and travelers with the utmost in rail transportation.

We are at your service.

Yours very truly,

G F Ashby

President,
Union Pacific Railroad

George F. Ashby

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliners

The Ideal SAVEALL Setup

1. Oliver Filter
2. with Wood Drum
3. and choice of Rubber-Lined, Stainless Steel, Tile or Coated Vat

This recommendation is based on a study of several hundred Oliver Savealls over a period of nearly thirty years. Naturally, we recommend the Oliver as the recovery unit but having used all sorts of materials of construction we are convinced that for most installations nothing can equal the wood drum for economy and durability. This is proved by operating records. And to insure non-contamination of stock, we recommend the use of one of these materials for the vat: rubber lining, stainless steel, tile, or special coating.

The Oliver Saveall also offers the choice of three sheet dischargers—Oliver Denhard, Hydrair or Roll—thus adding to its effectiveness.

If you want to save fiber, filler and water for re-use with the unit already used by several hundred paper mills, you will want the Oliver.

OLIVER UNITED FILTERS INC.

OF INC.

New York 18, N. Y.
33 West 42nd Street

San Francisco 11
California

Chicago 1, Ill.
221 N. LaSalle Street

Western Sales Division
Oakland 1, Calif.
2900 Glascock Street

Sales & Manufacturing Representative:
E. Long Limited
Orillia, Canada

Factories: Oakland, Calif. · Hazleton, Pa. · Orillia, Canada · Melbourne, Australia

Here's a lot of... PUMP in a small space

Goulds "Close-Cupld" Pumps are the answer to the operating man's problem—single shaft eliminates coupling and maintains perfect alignment, vibration free, no bedplate needed. All you do is to set this compact unit in place, connect it up and turn on the current. 17 sizes to select from—capacities up to 2000 G.P.M., heads up to 400, depending on capacity.

THESE IMPORTANT "CLOSE-CUPLD" FEATURES MEAN BETTER OPERATION

1. Shaft sleeve covers full length of shaft . . . compression seals between shaft sleeve and impeller hub and sleeve and shoulder on shaft completely protect shaft from liquid damage. Unlike most pumps, shaft sleeve is free to expand or contract with temperature changes—prevents buckling and distortion.

2. Machined stuffing box designed for die-formed, semi-metallic packing or mechanical seal *without* necessity of making machining changes . . . gives you operating flexibility.

3. Liquid deflector, mounted on end of shaft sleeve prevents leakage of liquid into motor bearing . . . is drilled and tapped so that it can be used to prevent shaft rotation while removing or tightening impeller nut; also, to remove sleeve . . . saves time.

4. New split gland simplifies repacking of stuffing box, when necessary, another time saver.

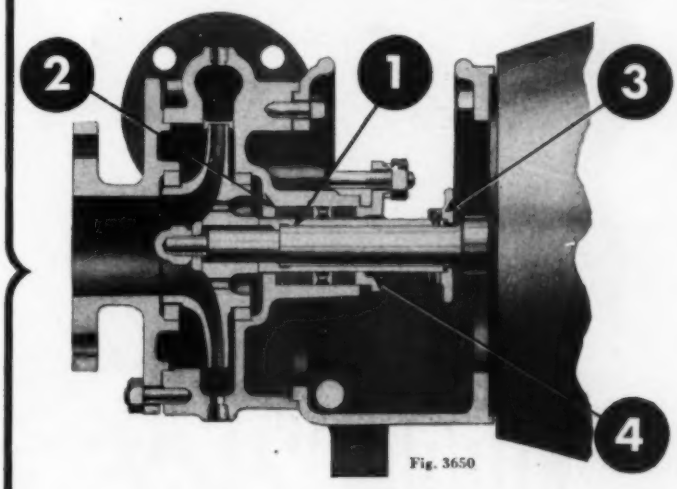


Fig. 3650

Send for your copy of Bulletin 710.1 today. You will find the data complete enough to enable you to select the proper pump and motor . . . make layouts and check all materials of construction.

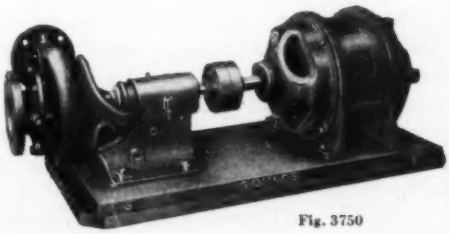


Fig. 3750

For heavy duty—general purpose pumping— *The Goulds "Support-Head" Centrifugal Pump*

Standardization of parts . . . extra heavy construction . . . 23 sizes . . . capacities up to 3000 G.P.M. are some of the reasons why so many companies standardize on Goulds "Support-Head" Pumps. For the whole story send for Bulletin 715.1.

GOULDS PUMPS, INC.

the PUMP FOR the JOB

GOULDS PUMPS, INC., Dept. PI-3, Seneca Falls, N. Y.

Please send me bulletins checked below!

☐ New "Close-Cupld" Pump Bulletin 710.1.
☐ New "Support-Head" Pump Bulletin 715.1.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Installed and recommended by a growing number of major equipment builders or their dealers

ROSS "BCF" COOLERS

For oil or water in small to medium size engines, turbines, gears or hydraulic presses

● A growing number of major equipment builders, in looking out for your interests, are installing Ross "BCF" oil and water coolers as *original equipment.*

On the other hand, many equipment builders leave it to their dealers to furnish Ross "BCF" Coolers as an optional accessory.

Either way, the chances are that the oil or water cooling will be done by a "BCF" unit when your next hydraulic press, plastic injection molding machine, die-casting machine, Diesel or gas engine, compressor, hydraulic coupling, torque converter, reduction gear, thrust bearing or turbine is placed into operation.

By this selection, both builders and dealers are providing you with: maximum heat transfer efficiency packaged in a compact, relatively small unit; extra rugged construction to withstand higher pressures; a favorable initial cost through standardization of a carefully engineered design; all nonferrous materials to prevent rust and corrosion; roller expanded, permanent, leak-proof tube joints; easy accessibility for inspection and cleaning.

It will be well worth your inquiring about the type oil or water cooler planned for your equipment. If it's not a Ross "BCF", familiarize yourself and then *insist* upon it! *Bulletin 4922, with complete design details, will be furnished gladly upon request.*

Ross Heater & Mfg. Co., Inc.

Division of American Radiator & Standard Sanitary Corporation

1430 WEST AVENUE BUFFALO 13, N. Y.

Ross equipment is manufactured and sold in Canada by Horton Steel Works, Ltd., Fort Erie, Ontario

You're Facing Extra Savings With Woodberry 887 Dryer Felts

There are hours and hours of extra wear in Woodberry 887 dryer felts. It's the result of Woodberry's patented feature—asbestos yarns woven at scientifically determined intervals into the face of these heavy duty felts.

There are extra savings, too, in the lowered steam consumption that results from Woodberry's high degree of porosity—and finer qualities of paper in Woodberry's highly uniform contact surface.

Take advantage of the all-around top notch performance of these durable reinforced dryer felts—specify Woodberry 887.

Mt. Vernon-Woodberry Mills

TURNER HALSEY
COMPANY
Selling Agents
40 WORTH ST. • NEW YORK

Branch Offices: CHICAGO • ATLANTA • BALTIMORE • BOSTON • LOS ANGELES • AKRON

What's new

Impco Stock Chest Agitation for all mill conditions

. . . in a modern, efficient

Screen Room Layout?

Several mills are now planning layouts similar to this. To achieve operation on more nearly one level the knotters are no longer in the screen room but are used before the brown stock washers.

Notice particularly the following:

. . . Flat screens are arranged in short lines at slight pitch

. . . Submerged inlets and forming aprons

. . . Stock is fed like paper machine from "fan" pump

. . . Intermediate underflow re-dilution between screens

. . . Stock consistency and quantity controlled by regulator and Impco Stock Volume Meter

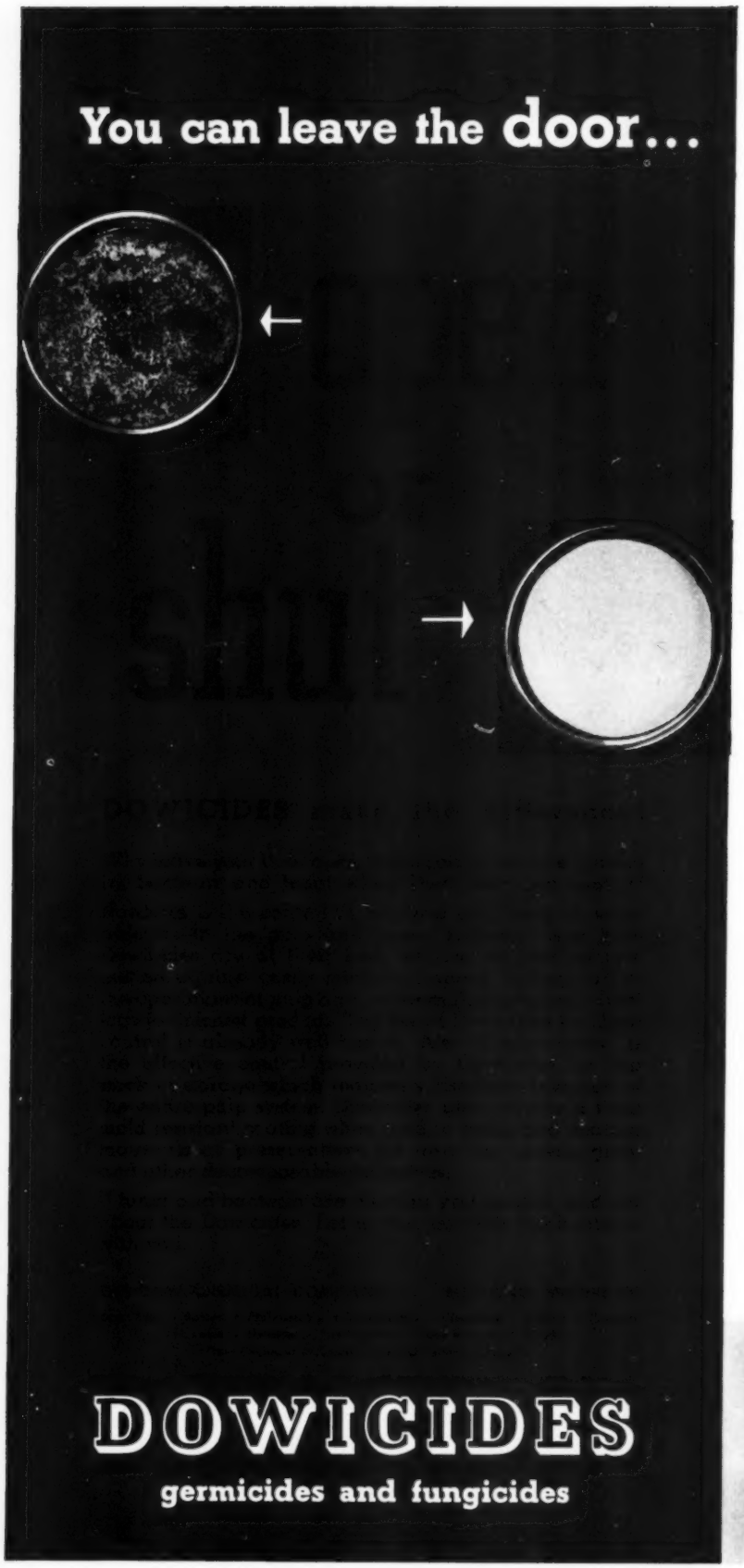
. . . All lines side by side so any proportion of total lines can be used for "primary," "secondary" or "tailers"

Weigh these factors for higher capacity and finer quality. If you are considering a new screen room or a better arrangement of present facilities, let us talk with you.

Improved Paper Machinery Corporation
Nashua, New Hampshire A-43

Impco

Pulp Mill Equipment "From Cooking to Use"



CHEMICAL COMMENTS

PAINT IMPROVER

Methocel (Dow Methylcellulose) is proving useful in many ways in the paint industry and especially to manufacturers of water-base paints. It keeps pigments from flooding, settling or caking, provides thickening and binding action, and also serves as a pigment disperser. Its protective colloid action prolongs emulsion stability. In addition, its controlled viscosity prevents undue penetration and assures excellent brushing characteristics.

A HOUSEHOLD WORD IN INDUSTRY

Epsom Salt is one of those many-sided chemicals with an important place in a host of diversified industries. It is not only a fine medicinal chemical, but also a rugged standby for many factory jobs. To leather producers, it is a requisite in several stages of the tanning process . . . to textile men, it is important in rayon manufacture and as an aid in dyeing textiles . . . to the paper industry, it is an essential ingredient in sizings. And it takes still other important roles in the ceramic and fertilizer industries.

SOLVING SOLVENT PROBLEMS

Conceded to be one of the best tar solvents known, Dow's o-Dichlorobenzene is coming into prominence as a highly useful cleaning agent for textiles. It is now being used for removing troublesome tar and tar-like substances from wool, and is particularly successful when used in combination with detergent mixtures. In addition to its tar-removing qualities, o-Dichlorobenzene is an effective solvent for waxes, and is an excellent paint remover.

Additional information about any of these products is available on request.

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

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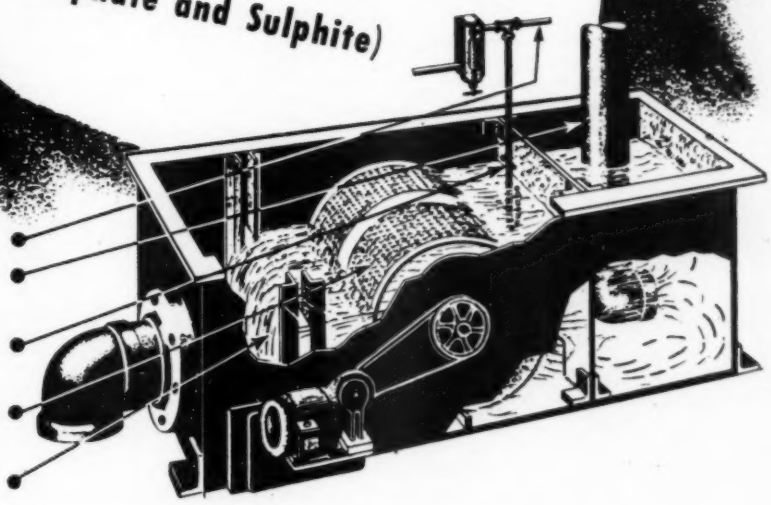
1948

Askania THIN STOCK CONSISTENCY REGULATOR

.1 to 1.5% (Sulphate and Sulphite)


TO CONTROLLER AND RECORDER
STOCK SAMPLE PIPE
BUBBLE TUBE MEASURING CONSISTENCY HEAD
ROTATING PERFORATED CYLINDER
SELF CLEANED BY WHITE-WATER BACKWASH

The Askania Thin Stock Consistency Regulator uses the new consistency measuring principle, the Drainage Rate Method... for accurate consistency control and, or accurate volume control ...for unknotted stock ahead of knotting screens, or for knotted stock after knotting screens.

It features an efficient, patented mixing box ... increases the capacity and efficiency of screens... gives higher tonnage output with lower loss of good pulp... reduces pumping costs ... increases capacity of present mixing and agitator systems.

Simple in operation, the Askania system requires only a continuous sampling of stock for regulation. It can be installed in conjunction with existing equipment.

Names of nearest mills where Askania Consistency Regulators are in operation will be send upon request.

Send for Booklet

completely describing and illustrating Askania Consistency Regulator and installations.

ASKANIA Controls

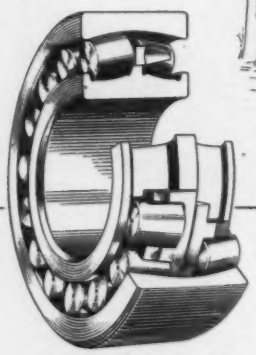
ASKANIA REGULATOR COMPANY

240 E. Ontario Street • Chicago 11, Illinois

A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

Get Longer Felt Life With Torrington Spherical Roller Bearings

Sensitive operation of Torrington Spherical Roller Bearings on dryer felt rolls of the Pusey & Jones paper machine reduces drag, prolongs felt life and saves power.



. . . uniform tension control possible with this new Torrington Bearing is important feature to Paper Industry.

REDUCED DRAG on dryer felt rolls is obtained when Torrington Spherical Roller Bearings are used. They provide uniform tension; hence longer felt life. Power consumption is reduced...service life extended because of the low coefficient of friction and high radial and thrust capacity. In addition, their design allows utilization of full shaft cross-section for greater strength. Shaft deflection is smoothly accommodated by the self-aligning feature. Positive sealing eliminates danger of spoilage of web through oil leakage.

These and many related advantages can be secured on calender rolls, presses and paper dryers, chippers, beaters, Jordan engines and screens through the use of Torrington Spherical Roller Bearings.

The specialized experience of Torrington's engineers is offered you to aid in the design, selection and application of all types of anti-friction bearings. Call or write the nearest Torrington office.

THE TORRINGTON COMPANY
South Bend 21, Ind. • Torrington, Conn.
District Offices and Distributors in Principal Cities

TORRINGTON BEARINGS

SPHERICAL ROLLER
TAPERED ROLLER
STRAIGHT ROLLER
NEEDLE
BALL
NEEDLE ROLLERS

Du Pont reds for papers

DU PONT BRILLIANT CROCEIN FL EXTRA CONC.
DU PONT CONGO RED
DU PONT CROCEIN SCARLET N EXTRA
DU PONT FUCHSINE CONC. POWDER
DU PONT PURPURINE 4B CONC.
DU PONT RHODAMINE B EXTRA
DU PONT RHODAMINE 6GDN EXTRA
DU PONT SAFRANINE T EXTRA CONC. 125%
HALOPONT* BRILLIANT PINK 2B
LITHOSOL* RED CSP
PONTACYL* CARMINE 2B
PONTACYL* CARMINE 2G CONC. 150%
PONTACYL* FAST RED AS EXTRA CONC.
PONTACYL* RUBINE R EXTRA CONC. 125%
PONTACYL* RUBY PL EXTRA CONC. 200%
PONTAMINE* FAST PINK EB EXTRA
PONTAMINE* FAST RED 8BL CONC. 125%
PONTAMINE* FAST SCARLET 4BS CONC. 150%
PONTAMINE* RED 12B EXTRA CONC. 200%

Among this list of reds, the paper dyer will find colors particularly suited to his specific requirements of shade, fastness, application method, furnish and cost. And, more important, Du Pont offers the assistance and "know how" of its Technical Staff in helping solve your color problems.
E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*Reg. U. S. Pat. Off.

Du Pont Dyestuffs

DU PONT
REG U S PAT OFF

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

PRECISION ...the key to efficient valve performance

Needless to say, a valve must operate with precision to perform efficiently in actual service. But to make this possible there must be precision in everything that goes before—precision in design, in selection of materials, and in finishing to exact specifications.

Throughout more than a century of making valves—and valves only—"precision" has been the watchword at Powell. That is why today, in every branch of industry, Powell Valves are noted for efficiency under any and all service conditions.

And don't forget that Powell Engineers are always glad to help you select the precise valves to meet your individual flow control requirements.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

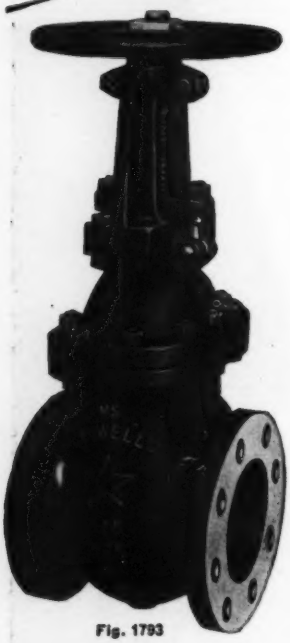


Fig. 1793

Fig. 1793—Large 125-pound Iron Body Bronze Mounted Gate Valve. Made in sizes 2" to 30", inclusive. Has outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Also available in All Iron for process lines.

Fig. 1503—Class 150-pound Cast Steel Gate Valve with flanged ends, bolted flanged yoke, outside screw rising stem and taper wedge solid disc.

Fig. 500—125-pound Bronze Gate Valve with screwed ends, screwed-in bonnet, inside screw rising stem, and either taper wedge solid or double disc.

Fig. 1969—150-pound Stainless Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke-bonnet and taper wedge solid disc.

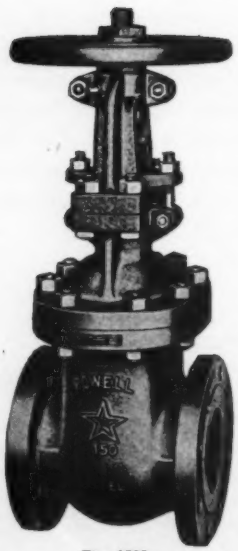


Fig. 1503

Fig. 500

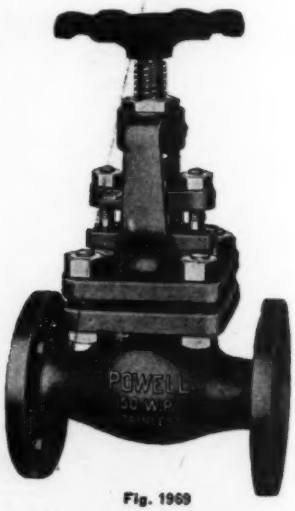


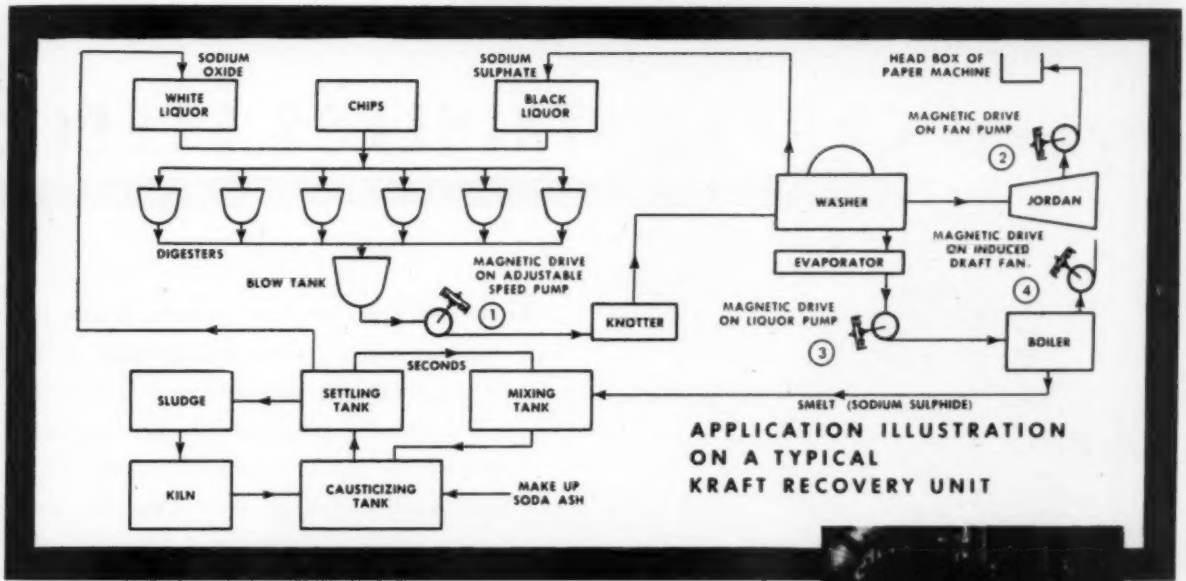
Fig. 1969

POWELL VALVES

Adjustable speed control

comes to centrifugal Pumps and Fans

with *constant* speed drive



APPLICATION ILLUSTRATION ON A TYPICAL KRAFT RECOVERY UNIT

Here is a simple electro-magnetic torque transmitter offering precise speed control for centrifugal pumps and fans—the E-M Adjustable Speed Magnetic Drive. Installed between a synchronous or induction motor and the driven pump or fan, and operating in combination with an electronic controller, it has provided a money-saving solution to many production problems, as indicated by these examples in paper mills:

CASE 1—Stock delivery from blow tank is automatically controlled by E-M Magnetic Drive regulation of pump speed, eliminating clogging at throttling valves and excessive stock delivery due to steam pressure surges during blow down of the digester.

CASE 2—E-M Magnetic Drive System controls variations in flow to head box by varying the speed of fan pump.

CASE 3—E-M Magnetic Drive System automatically regulates speed of liquor pump to suit varying viscosity of liquor.

CASE 4—Speed of induced draft fan is adjusted to suit draft requirements by E-M Magnetic Drive System.

Your E-M field engineer is ready to show you how E-M Magnetic Drive will solve your pump and fan speed control problems. Also we will be glad to send you our Publication No. 183 telling the whole story of Magnetic Drive construction, operation and advantages. Write for it now.

ELECTRIC MACHINERY MFG. COMPANY

MINNEAPOLIS 13, MINNESOTA

4400-TPA-2060

● Two 40 h. p., 1707/1056 E-M Magnetic Drives drive black liquor pumps at adjustable speeds in Wisconsin paper mill.

● Automatic control of flow from blow tank is provided by this installation of E-M Magnetic Drive.

● Wide-range, precise boiler draft control provided by this 100 h. p., 870/87 E-M Magnetic Drive Unit.

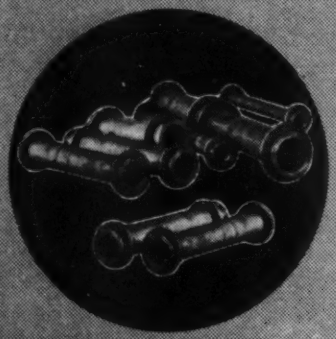
ADJUSTABLE-SPEED

MAGNETIC DRIVES

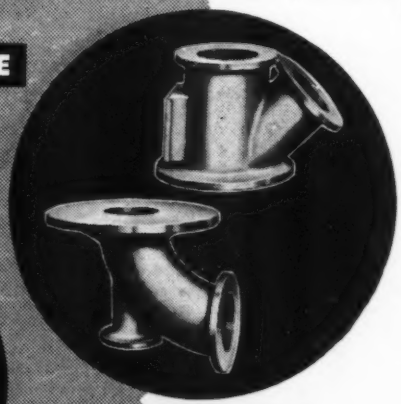
RESIST

CORROSION · ABRASION · HEAT *in the Paper Mill*

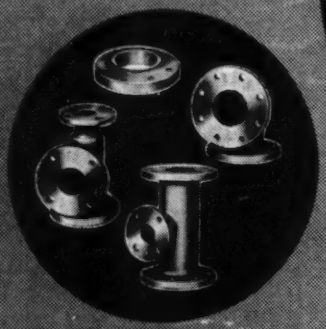
with COOPER STAINLESS STEEL...



CENTRIFUGAL PIPE



CASTINGS



FITTINGS

COOPER'S years of close association with the Paper Industry and its intimate knowledge of the problems peculiar to that industry . . . plus vast technical experience combined with practical shop skill has resulted in COOPER'S unusual ability to produce sound corrosion resisting Stainless Steel castings, fittings, and centrifugal pipe specifically designed to resist corrosion, abrasion and heat in the Paper Mill.

Each step in the production of COOPER Stainless Steel products is fully controlled . . . for all facilities and services at COOPER are located under one roof making The Cooper Alloy Foundry Co. the largest of its kind in the country.

Est. 1922

THE COOPER ALLOY FOUNDRY CO.

HILLSIDE, NEW JERSEY

Specialists in Corrosion Resisting Stainless Steel . . . for a Quarter of a Century

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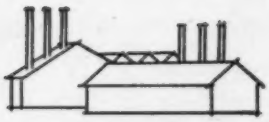

in

new

paper mills

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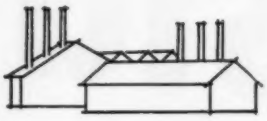


HERCULES **size**

Those new paper mills springing up around the country are the last word in engineering, machinery, and technology. While one new plant may differ slightly from another, collectively they indicate the trend to Hercules size in today's papermaking. A new paper mill deserves the *best*. That's why the modern trend is to Hercules size—a quality product backed by helpful technical service.

HERCULES

SIZING MATERIALS AND CHEMICALS FOR PAPER

HERCULES POWDER COMPANY
961 King Street, Wilmington 99, Delaware

Vanesta

The Starch Stabilizer

Stops Gelling
Improves Flow
Gives Uniform Consistency

Sample on request

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

Paper Products in Continued Demand

▸▸▸ ACCORDING to the Department of Commerce, the demand for pulp, paper and all products converted therefrom will continue unabated through only 1948.

Two months of this year's operations already are checked into the record, and while production has been maintained at an all-time high peak, demand for paper products has exceeded the supply.

There are some market observers who hold the opinion that the supply situation will overtake the demand later in the year.

This same opinion has been voiced ever since V-E Day, now three years ago. Each year since, the prognosticators have come out strong for a recession in general business and a curtailment of over-all demand for paper products. Yet, neither prediction has come to pass. On the contrary, the general business has made its postwar adjustment and is now engaged in the greatest economic expansion in every division of industry, trade and commerce.

The whole wide world is calling for and needs the products of American industry. Can anyone cite one country on earth that is not knocking at our doors, asking for food, fuel or family supplies for their anemic country?

Until we have definite evidence that the other countries on the globe are producing sufficient goods to give their inhabitants the barest necessities of life in sufficiency, all talk of recession or depression of demand for all the commodities that America produces, is futile.

Witness the irrepressible rising demand for paper products.

For the year of 1946, the over-all increase in consumptive supply was 1,900,000 tons. At the end of that year, it had all been absorbed.

For the year 1947, the over-all supply of paper products for consumption was 1,700,000 tons. In turn, all of that increase went into consumption and consumers are clamoring for more paper products.

The demand is greater than the supply of paper today and according to the Department of Commerce, it will so continue throughout 1948.

Recently the National Industrial Conference Board said that "the recent baby boom means the United States may have a peak population of 10,000,000 to 25,000,000 higher than had been counted upon—the reproduction rate in 1946 was 20 per cent above 1945 and it continued higher in 1947."

There we have one of the basic causes for the continued increased demand not only for paper products, but for every other commodity deemed necessary by consumers for their welfare in America.

Every child comes into this country cackling for its share of the per capita consumption of its goods.

More paper is demanded by more people for more uses every day.

The expansion of demand is the most amazing happening in this nation's history. It is "continuing" this year as the Department of Commerce says.

The amazing increase in population will continue this year as the Conference Board says.

And we agree that despite all the uncertainties of this political year, the momentum of our volume of increasing business will continue.

"Uncle Sam is outgrowing his breeches."

Technical Progress

▸▸▸ AS THE TEMPO of industry in these fast-moving times is governed to a large degree by the power of scientific understanding, industrial leaders now stress the unquestioned fact that the progress of all industry is paralleled by technical training. Empirical research methods are no longer relied upon wholly to solve technical problems which confront every industry, and research today moves much faster in the bright light of scientific understanding.

Technical training in the paper industry is not only accepted as essential, but the need for and the value of such knowledge has caused many eager groups to seek the formal study of technical subjects. Educational movements in the industry are evidenced by the awarding of scholarships to students, and a variety of papermaking courses being offered in special classes of several important institutions.

The mayor of Chicago named the week of March 21 as "Technical Progress Week," to honor men of engineering, science, and technology in recognition of their part in the life and progress of that city and the nation.

A major step was taken during the meetings of Paper Week when that accepted and qualified group of paper mill technicians known as the Technical Association of the Pulp and Paper Industry announced that beginning with next year TAPPI will publish its own Journal. This Association now marks twenty-seven years of growth with a membership exceeding 3,000 which proves that knowledge is power. The research findings presented through papers prepared by members of the Technical Association are invaluable to every man connected with the papermaking industry and a large number of its affiliates. With the establishment of its official publication, TAPPI begins a new chapter in Association growth which unquestionably will illuminate new horizons for the entire paper industry.

Current Thought (1927-1948)

Editorial Comment on Timely Subjects (1924—1927)

▶▶▶ NO MORE FITTING tribute might be written of the author whose writings have appeared on this page for the past twenty-four years than the words of Henry Ward Beecher:

"Unless a man can link his written thoughts with the everlasting wants of men, so that they shall draw from them as from wells, there is no more immortality to the thoughts and feelings of the soul than to the muscles and the bones."

It is believed that in writing on the events of the past month, Mr. Williams would have dealt retrospectively with his comment in several issues of the past volume. These excerpts have been lifted from those writings and we believe form a thought symposium that is, strangely enough, forthright with the times.

▼

"Every once in a while when I am feeling low and want a good laugh, I trot out some of the economic and political prophecies I have at one time or another caused to be published. Some are really funny, now that they may be reviewed in the light of later day events. . . . But there are some things I have urged which I wish might have been adopted at the time of their proposal. . . . Because we inherited unquestioned leadership of the world (whether we like it or not) we will some day have to fight Russia. Democracy and communism are two ideologies so diametrically opposed that they cannot live together in peace on any one planet."

▼

"I made so bold, at the time of Germany's surrender, that we, right then, declare war on Russia. . . . Today's Russia is a newcomer among nations. As a world power, the U.S.S.R. has existed only since 1917. That's 30 years. And that is in contrast to our 160 years. So far as a nation is concerned, Russia is an adolescent—a youngster who thinks he knows all the answers and will not be told. . . . And that attitude, with the power now rapidly being assembled by Russia, is going to cost the world a lot of grief—somewhen. The time to have stopped it was in the spring of 1945. It is still not too late."

WILLIAM SIBLEY

(Russell Byron Williams)
1893—1948

(See Necrology, Page 1647, February, 1948)

"Most of us have had little difficulty recognizing the logical end result of international co-operation. The majority readily acknowledge the crying need for such unified effort. . . . In spite of good intentions and the teachings of high-minded ecclesiastics, we have fought a major war once every generation—and there is little evidence of a basic change in humanity. . . . What has happened is the rise of completely changed work conditions."

▼

"Today an entirely new balance of power exists and whether we like it or not, it is in Uncle Sam's lap. From training dating back to George Washington's warning against entangling alliances, and long years of successful isolation behind our Atlantic barrier, we shy from the very thought of such responsibility. But wanted, or unwanted, the international seesaw has lengthened to span the Atlantic. If we do not accept the responsibility for world leadership, which Britain has carried for generations, Russia will."

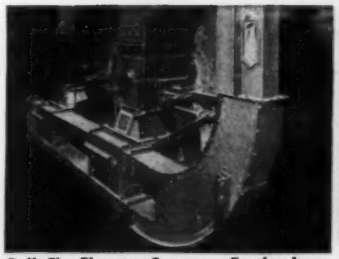
▼

"U.S. power is already spread over the planet. It is up to us to keep it there, and in places spread it still farther—in other places, clinch it tighter."

▼

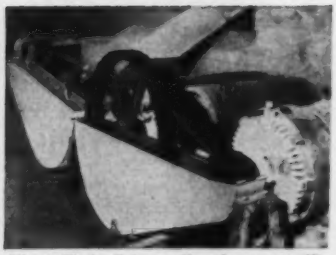
"The road ahead for the U.S. is long and arduous. But if we don't take it—and travel fast—Russia will."

"A COMPLETE SERVICE"
LINK-BELT
CONVEYORS, MATERIALS HANDLING, PREPARATION EQUIPMENT AND POWER TRANSMISSION MACHINERY



Bulk-Flo Elevator-Conveyor Feeder handling mineral mix from mixers to storage bins.

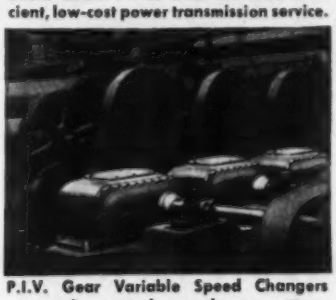
Vibrating Screens assure removal of oversize chips, slivers and sawdust.



Silent Chain Drives offer the most efficient, low-cost power transmission service.

Screw Conveyors offer many advantages in handling bulk materials — made in all types and sizes.

• Submit your materials handling and power transmission machinery problems to Link-Belt. Our experienced engineers will carefully analyze your requirements and make impartial, constructive recommendations. We will be pleased to engineer and supply your complete installation, or if preferred, simply supply the parts desired.



P.I.V. Gear Variable Speed Changers accurately control speeds on cutters, press-rolls, coaters, pumps, etc.

All types and sizes of Belt Conveyor Idlers and Trippers for handling sulphur, lime, salt cake, wet pulp, etc.

Slasher table equipped with 14 strands of Link-Belt SM-592 conveyor chain.

Herringbone, Worm and Gearmotor Speed Reducers and Increasers for every power transmission service.

Chains for conveyors and elevators . . . there is a standard Link-Belt Chain for every service.

The Line of Power Transmission Machinery is complete—one source—one responsibility assures efficient performance.

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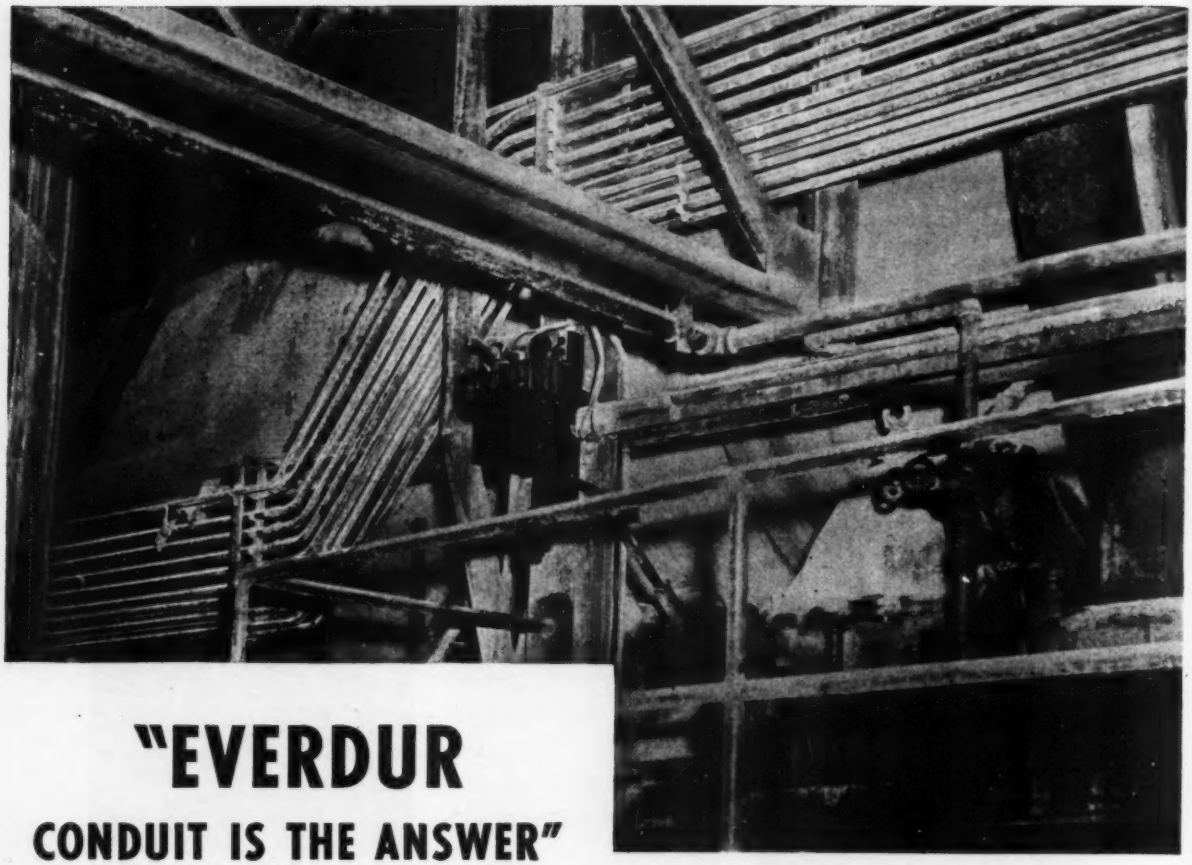

"EVERDUR CONDUIT IS THE ANSWER"

. . . says Chief Engineer of West Virginia Pulp and Paper Company

LIKE MANY another paper mill, the Caustic Plant of the West Virginia Pulp & Paper Company at Luke, Md., has been using large quantities of Everdur* Conduit—in this case for 12 years. Says the plant's Chief Engineer, F. L. Davis:

> *"In places where corrosion has given us considerable trouble in the past, Everdur Conduit has been the answer. We find that it is economical to use Everdur Conduit in corrosive atmospheres and wherever circuits are subject to water washings from floors."*

Everdur Conduit may eliminate *your* electrical circuit corrosion problems too. For Everdur has corrosion resistance equal, or superior, to copper. Installations made since 1933 have shown time and again that, where ordinary conduit fails in months, Everdur Conduit lasts for years.

Everdur Copper-Silicon Alloy Conduit possesses high strength, is non-magnetic, workable and weldable. It is available in two wall thicknesses: rigid conduit (RC) in nominal sizes from ¼" to 4" inclusive; and the thinner walled electrical metallic tubing (EMT) in nominal sizes ⅜" to 2" inclusive. Complete lines of fittings . . . connectors, couplings, outlet boxes, etc. . . . are available in Everdur Alloys from leading manufacturers. 48221

*Reg. U. S. Pat. Off.

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ELECTRICAL CONDUIT

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD.
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You can't kill them all

with the same chemical

Making a count of organisms on agar plate in Nalco Bacteriological Laboratory — part of the world's finest water treatment laboratory.

Nalco has developed an effective control for each! . . .

THERE are a variety of slime-producing organisms, each with individual characteristics, each with a different resistance to controlling agents.

Nalco will determine the types of organisms encountered in your mill and provide the correct chemicals for completely successful control. But the Nalco System does not stop with the correct chemicals: It includes easy-to-use feeding equipment, determination of dosages and points of application and constant check-ups to maintain permanent slime control.

Mills that have tried the Nalco System have found a final answer to the slime nuisance — over 77% of Nalco paper mill clients have used the system for more than 5 years, more than 30% have been getting results they like for over 10 years.

Let Nalco help you secure *permanently* successful slime control. Write for details and literature.

NATIONAL ALUMINATE CORPORATION

6232 W. 66th Place, Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem Limited, 555 Eastern Ave., Toronto 8, Ontario

— A Complete Scientific Paper Mill Water Treating Service — Slime Control . . . Water Softening and Clarification . . . Controlled Alumina Sizing Method . . . Boiler Feedwater Treatment.

ASME Boiler Code Committee Approves

ADDITIONAL TYPES OF CLAD STEEL PLATE COMPLYING WITH ASME CLAD STEEL SPECIFICATIONS FOR FUSION-WELDED PRESSURE VESSELS

Fabricating Clad Steel pressure vessels in accordance with paragraph U-69 of the Boiler Code. These vessels, being built of 15% Lukens Stainless-Clad Steel (stainless type 316 with .03 max. carbon) are 40′ long by 13′ in diameter.

Type 405 Stainless-Clad Steel has been approved for U-69 and U-70 construction without the necessity of stress relieving. Monel-Clad and Inconel-Clad Steels have been approved for fusion-welded pressure vessels. Special temperature and pressure restrictions on the use of Nickel-Clad Steel have been removed. These revisions are included in the new interpretation under Case 896 of the ASME Boiler Code.

Materials covered by this approval are described in ASME (also ASTM) Specifications SA-263 on chromium steel clad plates, SA-264 on chromium-nickel steel clad plates and SA-265 on nickel and nickel-base alloy steel clad plates. Complete details of the Case appear in the February, 1948, issue of "Mechanical Engineering".

Lukens Clad Steels—Nickel-Clad, Stainless-Clad, Inconel-Clad and Monel-Clad—can be ordered to these Specifications. Each Clad Steel plate is a precision product, controlled from assembly to finish, consisting of a layer of the corrosion-resistant metal permanently bonded to a backing plate of ASME specification steel.

Lukens Clad Steels represent the most complete range available to industry. For additional information write for Bulletins 338 and 255, Lukens Steel Company, 408 Lukens Building, Coatesville, Pennsylvania.

CLAD METAL STEEL

LUKENS

Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

★

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

Here is the CMH contribution to maximum expansion joint life

CMH Controlled-Flexing Expansion Joint
CMH Expansion Joints are Flexonically* engineered to minimize internal stresses and to uniformly distribute working stresses
CMH Free-Flexing Expansion Joint

The corrugations of CMH Expansion Joints are scientifically formed by advanced methods developed through years of experience. Advanced forming methods coupled with carefully controlled heat treating minimize the internal stresses normally developed in fabrication. Working stresses are held in balance by FLEXONICALLY* engineered curvature of corrugations to best distribute the forces resultant in service.

These remarkable design features make possible completely dependable expansion and misalignment control in a compact unit with no maintenance or other service attention.

CMH CONTROLLED-FLEXING EXPANSION JOINTS

Sizes 4" to 24" Inside Diameters. For Pressures up to 300 p.s.i. Temperatures to 900°F. Copper or Stainless Steel Pressure Carriers. Traverse from 5/16" to 6-3/4". Flanged or Welding Ends. Control Rings Corrugation-mated to close working tolerances.

CMH FREE-FLEXING EXPANSION JOINTS

Sizes 4" to 24" Inside Diameters. For Pressures up to 30 p.s.i. Temperatures to 900°F. Copper or Stainless Steel Pressure Carriers. Flanged or Welding Ends.

Get full details today. Write for the new CMH Expansion Joint Bulletin EJ-47.

"FLEXON" identifies CMH products, which have served industry for more than 45 years.

*the science of FLEXONICS . . . "the controlled bending of thin metals for use under varying conditions of temperature, pressure, vibration and corrosion" . . . is exemplified in the basic products of Chicago Metal Hose Corporation.

CMH EXPANSION JOINTS

CHICAGO METAL HOSE CORPORATION

Expansion Joint Division • Maywood, Illinois

Plants at Maywood, Elgin and Rock Falls, Illinois

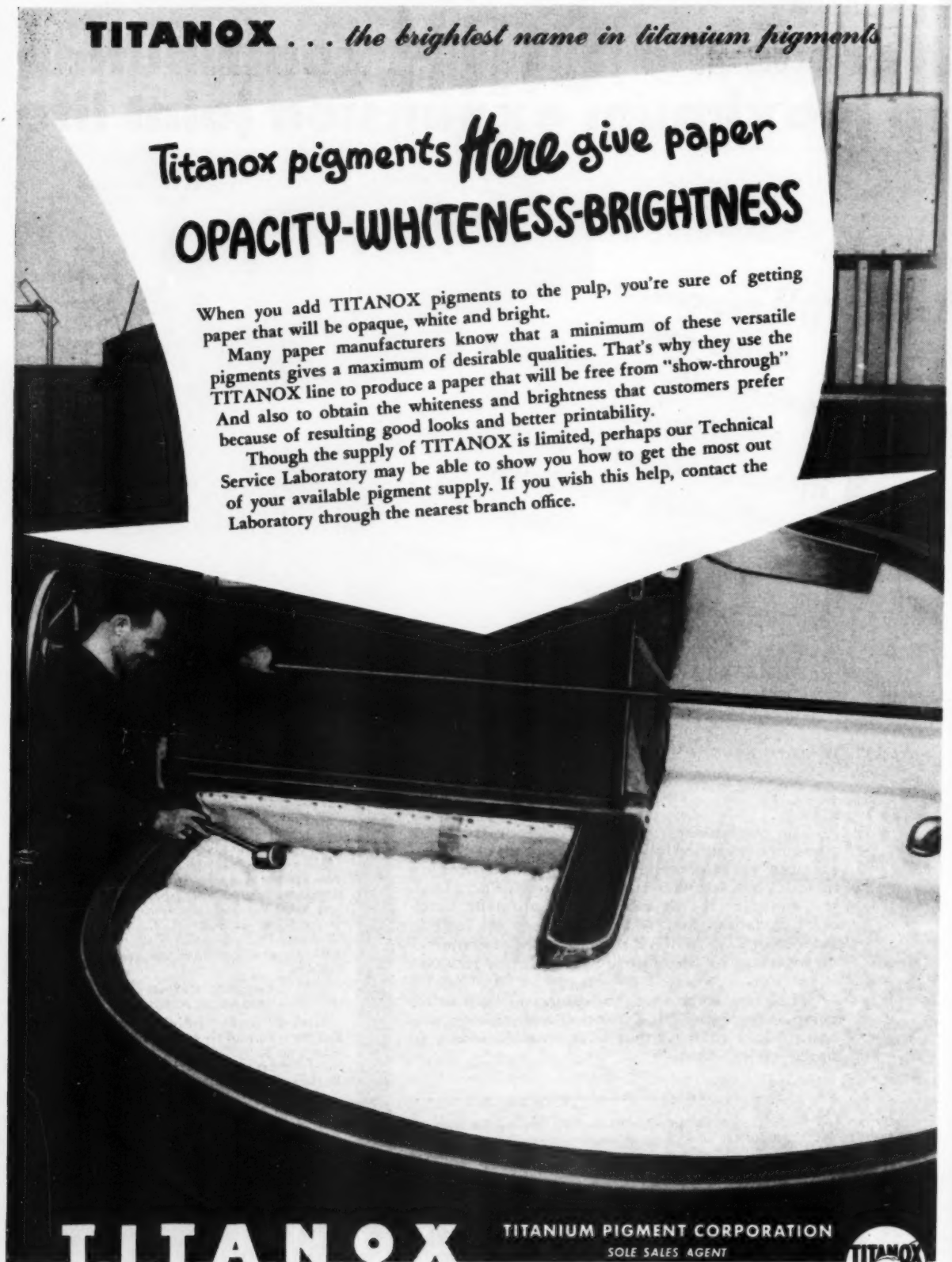
TITANOX . . . *the brightest name in titanium pigments*

Titanox pigments *Here* give paper OPACITY-WHITENESS-BRIGHTNESS

When you add TITANOX pigments to the pulp, you're sure of getting paper that will be opaque, white and bright.

Many paper manufacturers know that a minimum of these versatile pigments gives a maximum of desirable qualities. That's why they use the TITANOX line to produce a paper that will be free from "show-through" And also to obtain the whiteness and brightness that customers prefer because of resulting good looks and better printability.

Though the supply of TITANOX is limited, perhaps our Technical Service Laboratory may be able to show you how to get the most out of your available pigment supply. If you wish this help, contact the Laboratory through the nearest branch office.



TITANOX

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6285

MISSISSIPPI RIVER MUD is this valve's regular diet

Raw, silt-laden Mississippi River water at 175 p.s.i. had quickly destroyed conventional type valves through abrasive action and corrosion of exposed working parts in Union Electric Company's Venice, Illinois Plant. Then, their own engineers and Stone & Webster Engineering Corporation selected Grinnell-Saunders Diaphragm Valves. These flanged, unlined valves with rubber diaphragms have already served several times longer than previous valves, and are still going strong.

YOU, too, may find your answer to valve troubles due to corrosion, contamination or suspended solids, in

GRINNELL-SAUNDERS DIAPHRAGM VALVES

ISOLATED WORKING PARTS — The flexible diaphragm isolates working parts of the valve from the fluid, preventing contamination or corrosion.

CORROSION-PROOF LININGS — A selection of diaphragm materials and also body linings of glass, porcelain, lead, rubber or synthetics to suit your service requirements.

STREAMLINED FLOW . . . POSITIVE CLOSURE — Streamlined passage without pockets minimizes friction. Large area of contact of the diaphragm, plus diaphragm resilience, permit positive closure even when solids are trapped.

Write for catalog—Grinnell-Saunders Diaphragm Valves.

GRINNELL COMPANY, INC.
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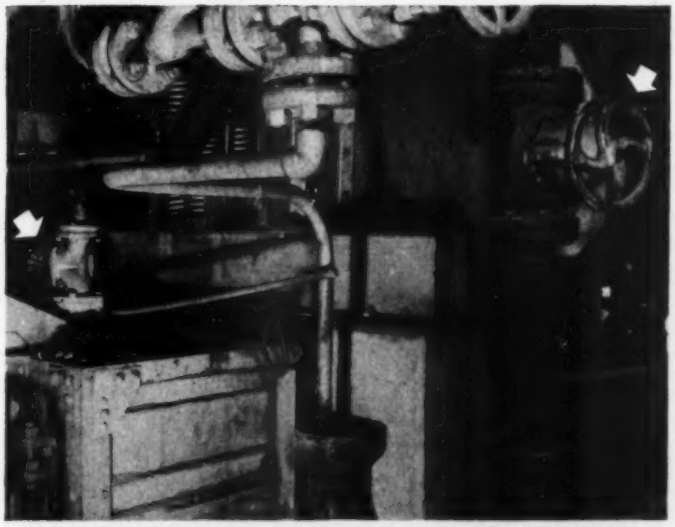

Grinnell-Saunders Valves on ash sluicing lines in central power station.

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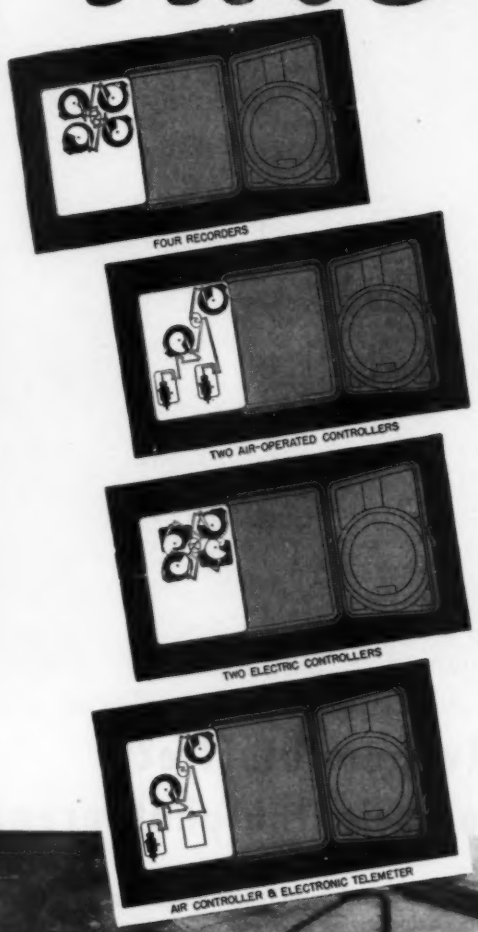

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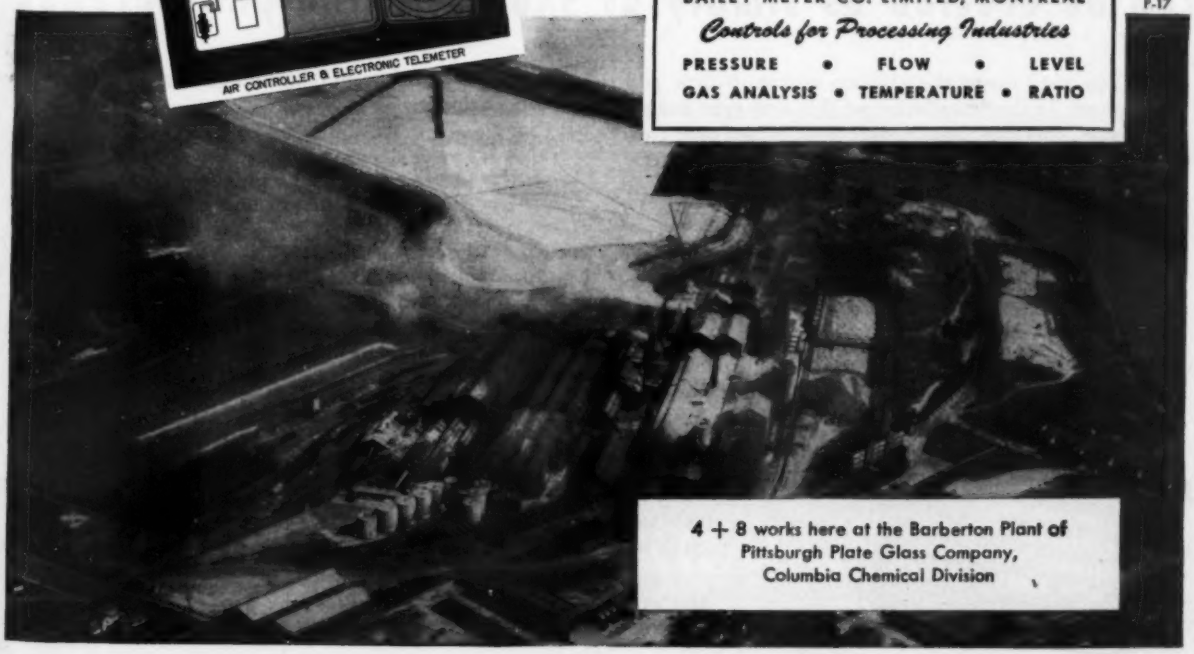

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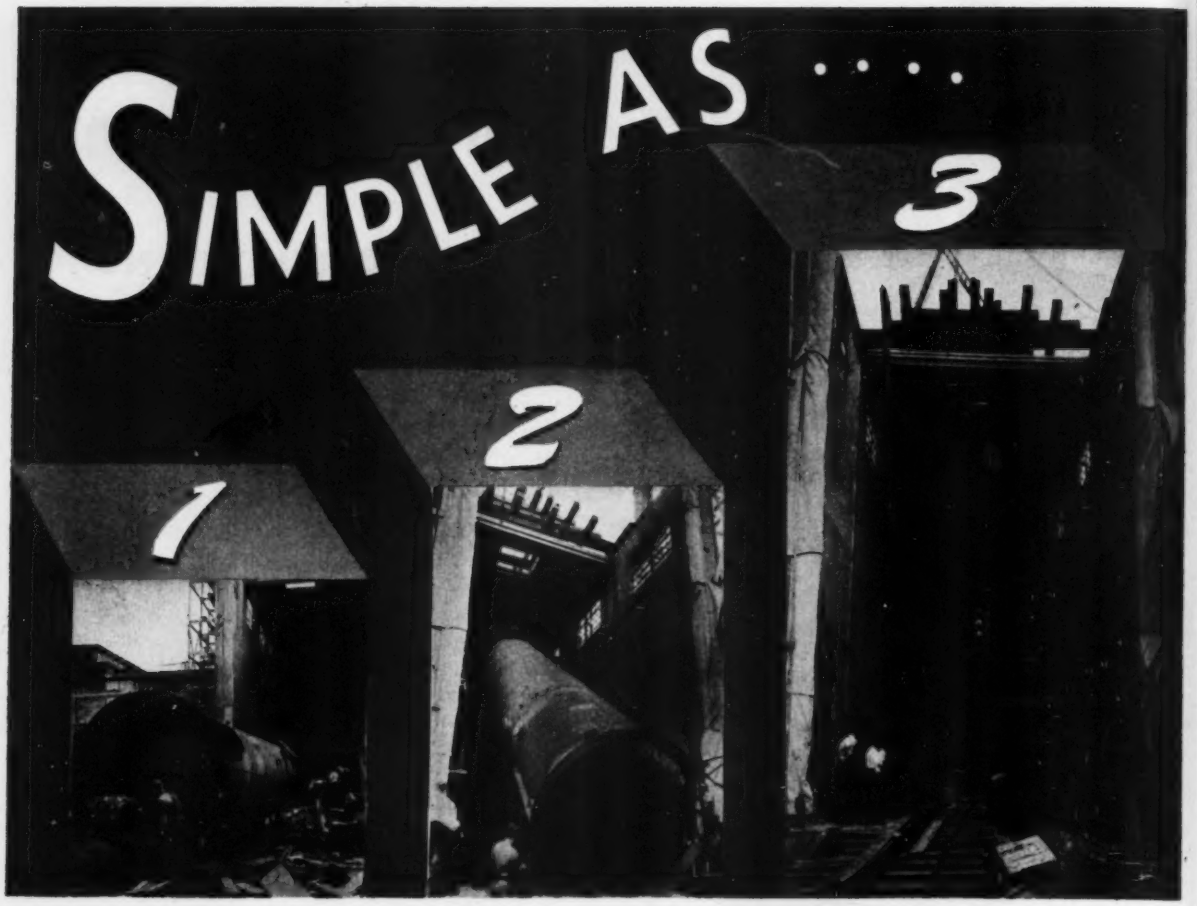

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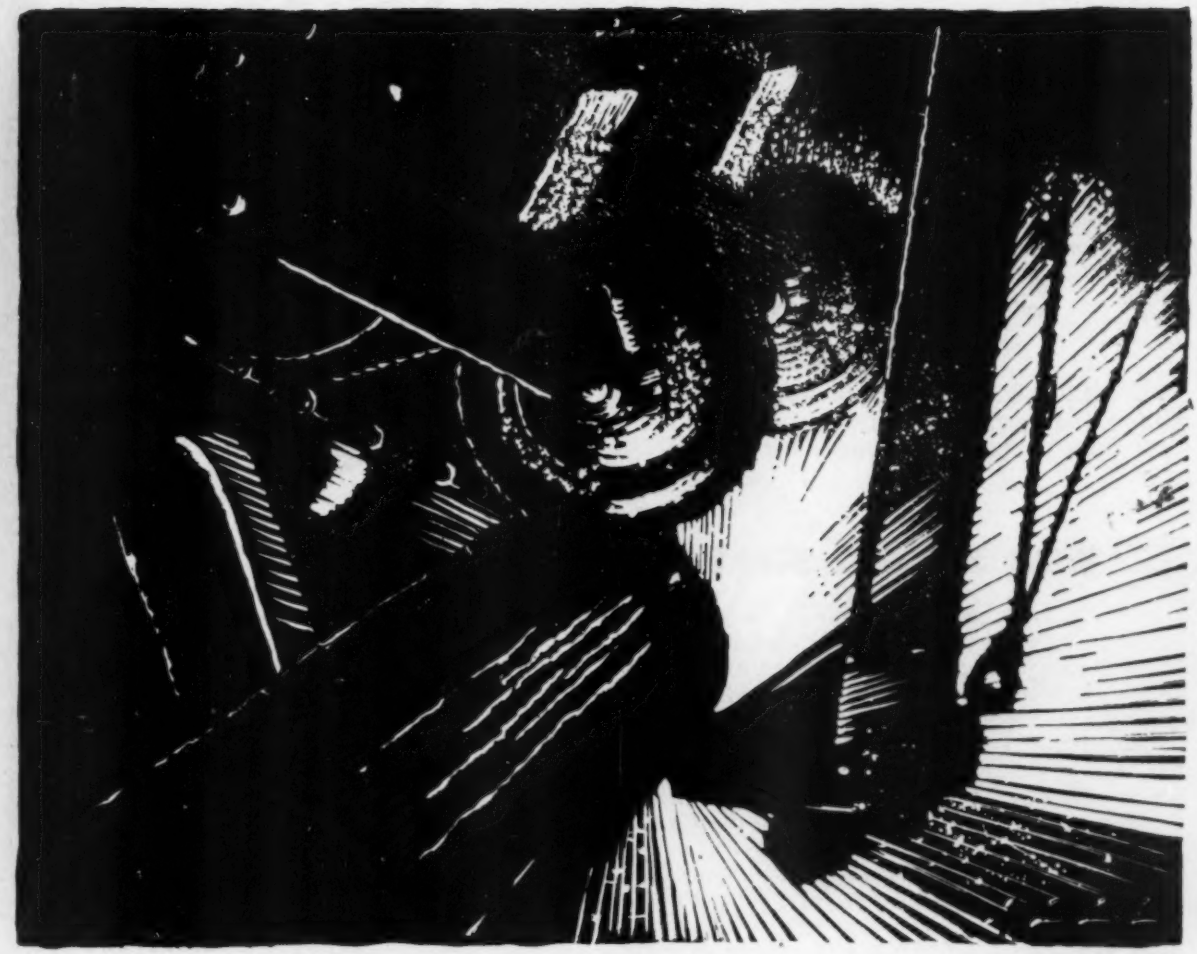

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*This one is fictitious—but it might be any corporation president.

The Treasury Department acknowledges with appreciation the publication of this message by

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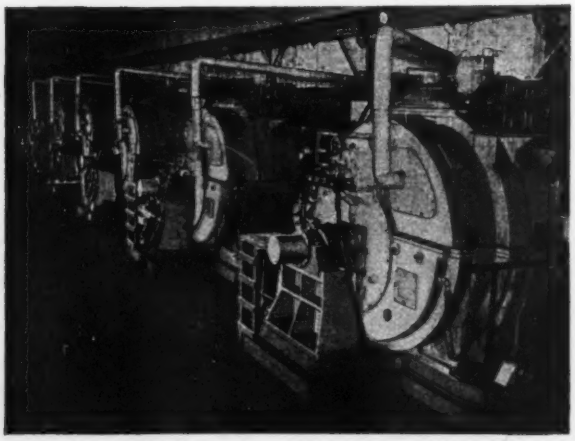

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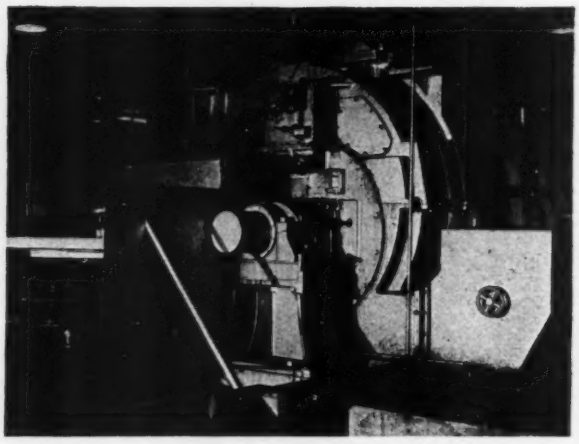

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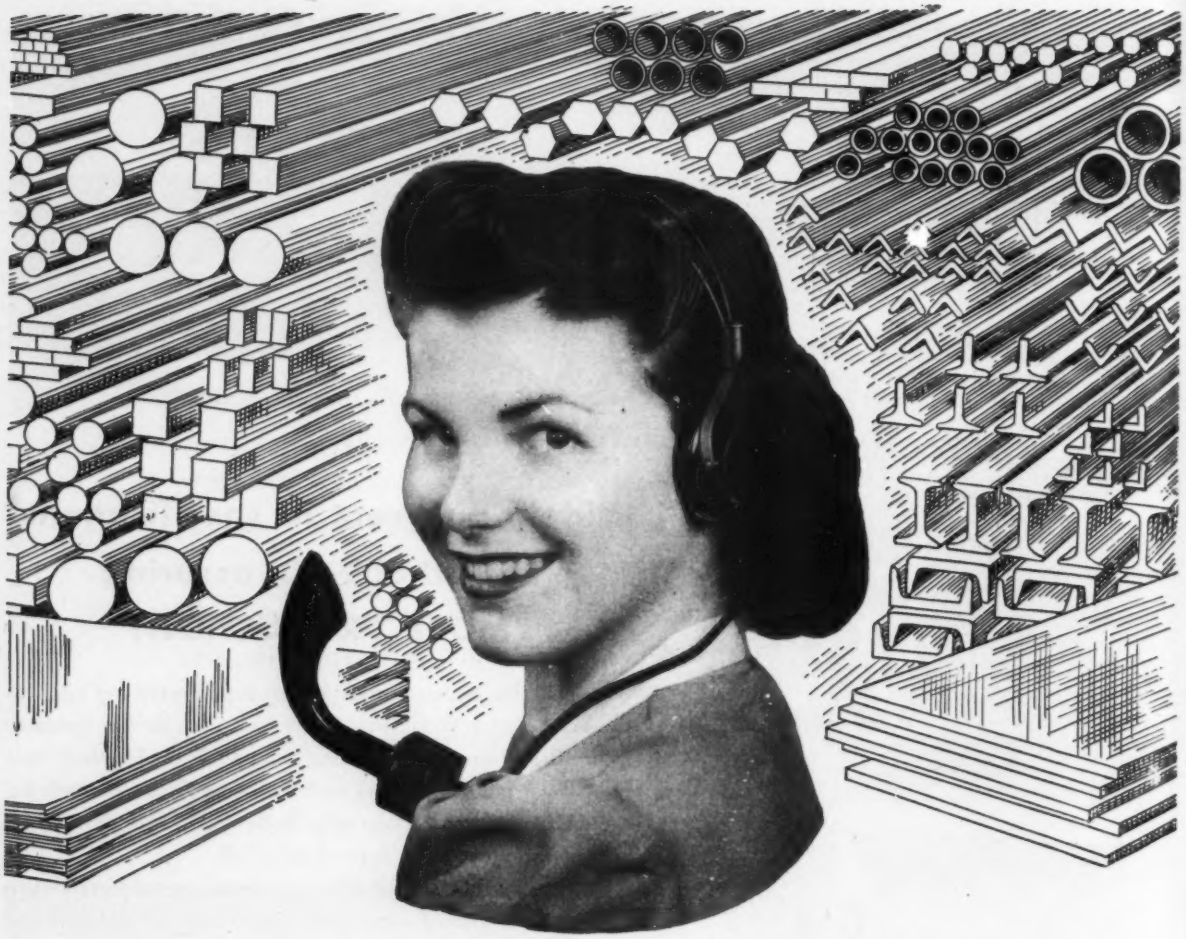

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and PAPER WORLD

MARCH 1948

Some Data on

Chemical Composition of Cereal Straw

E. L. RITMAN
F. M. MULLER
J. G. DIJKHUIS

Netherlands Experiment Station for Utilization of Straw
Groningen

▸▸▸ THE DIGESTION OF straw with various chemicals has been the subject of wide study and research by the Netherlands Experiment Station for the Utilization of Straw.

Major objectives of this group of producers and consumers of straw, which group was founded in 1939, have been to find new outlets for the agricultural waste and the ultimate stabilization of the price of straw at a reasonable level, from the farmers' viewpoint.

This work was carried out in order to find methods for using the straw in the manufacture of pulp for conversion into newsprint and packing paper. *(The progress of this study has been published in the N.E.S.U.S. publications shown in the attached list.)* The authors present here a part of the data so obtained.

▸▸▸ SAMPLES OF barley, oat, wheat and rye straw were collected over a period of four years (1939-1942) from a number of farms in the provinces of Groningen and Drenthe. The samples were obtained direct from the fields after mowing. Some of the samples came from heavy soil (clay with a varying percentage of sand); some, from light soils (sand or sand mixed with peat—the latter type occupying most of the southeastern part of Groningen and the adjacent part of Drenthe).

The samples of the same kind of straw from the same type of soil were chopped, mixed and ground in a manner to yield eight mixed samples as follows: summer barley from heavy soils, winter barley from heavy soils, oat from heavy soils, oat from light soils, summer wheat from heavy soils, summer wheat from light soils, winter wheat from heavy soils, and rye from light soils. (In the Netherlands, oats are always grown as a summer crop; rye, as a winter crop. Barley and winter wheat are grown commonly on heavy soils, rye, usually on light soils.)

Analytical data covering the various samples obtained during 1941 and 1942 are shown in Table 1. (Analytical procedures followed in this work are given in publications of the Netherlands Experiment Station for Utilization of Straw—see Nos. 1 and 2, N.E.S.U.S. list appended.)

Total ash was determined by treating straw sample with sulphuric acid (subsequently evaporating it off), followed by water extraction of the residue, glowing of extraction residue, addition of extract to residue, and finally evaporation of the residue to dryness and glowing. This procedure was adopted in order to avoid occlusion of carbon particles in the ash.

Referring to Table 1: This occlusion does not occur with ash that is insoluble in water or with the ash of holocellulose and alpha-cellulose (columns 6, 11 and 15 respectively).

Protein figures (columns 4 and 7) were obtained by multiplying the Kjeldahl nitrogen content by 6.25. Holocellulose determinations (columns 10 and 12) were obtained by cold treatment with a solution of chlorine dioxide and pyridine. (These determinations were made because the term holocellulose is widely used in the literature; yet these figures are believed to be of doubtful value. Ritter and Kurth, who coined the term, think it an efficient successor to E. Schmidt's term *Skelettsubstanz.)*

The figures in column 18, covering the remainder, were obtained by adding the figures of the following columns: column 3 (ether extract), column 5 (water extract), column 6 (insoluble ash), column 7 (insoluble protein), column 8 (lignin), column 9 (pentosan) and column 17 (pure alpha-cellulose); and subtracting the sum from 100.

Most tests did not show any regular variation during the four years covered by the analyses. However, there was a slight tendency for the total ash to decrease from 1939 to 1942. This tendency probably was due to the shortage of fertilizers during the war. Other ash figures, not exhibiting this tendency, consisted chiefly of silica which originates from normal soil constituents. Except for oat straw from light soils and summer wheat straw, there was a somewhat more marked tendency of the water extract to decline and of the holocellulose to increase over the four-year period. Perhaps the shortage of fertilizers caused a conversion of soluble compounds into insoluble cell wall material. Because of this tendency, only average figures for the 1941 and 1942 samples were calculated.

From the general average figures in Table 1, the per cent composition of Dutch cereal straw may be stated to

TABLE 1—Average Composition of Straw Samples for 1941 and 1942 (Per Cent of Oven-Dry Matter)

1	2	3	4	5	6	7	8	9	10	11	12	13		14	15	16	17	18
Sample Designation	Total ash	Ether extract	Total protein	Water extract	Insoluble ash	Insoluble protein	Lignin	Pentosan	Holocellulose	Ash in holocellulose	Pure holocellulose	Ash- and Pentosan-containing α-cellulose			Ash in α-cellulose	Pentosan in α-cellulose	Pure α-cellulose	Remainder
												% of holoc.	% of straw					
Summer barley	10.5	1.5	2.5	12.0	2.7	1.4	16.2	27.0	73.9	2.6	71.3	53.4	39.4		1.4	2.0	36.0	3.2
Winter barley	8.7	1.2	2.9	12.3	1.9	1.4	16.9	26.4	72.8	1.8	71.0	54.4	39.5		1.1	1.7	36.7	3.2
Oats heavy soils	11.9	1.2	2.5	14.9	2.3	1.3	15.5	26.0	71.7	2.3	69.4	55.0	39.4		1.3	1.8	36.4	2.4
Oats light soils	7.4	1.5	2.3	14.8	0.7	1.3	16.7	26.4	70.2	1.2	69.0	54.2	38.0		0.4	2.3	35.4	3.2
Summer wheat heavy soils	11.2	1.2	3.3	12.0	4.4	1.6	16.3	26.2	74.0	4.2	69.9	53.7	39.8		2.8	2.4	34.6	3.7
Summer wheat light soils	5.1	1.4	3.5	13.4	0.9	1.8	17.0	27.0	72.1	1.2	70.9	52.8	38.0		1.2	2.4	34.4	4.1
Winter wheat heavy soils	11.1	1.0	2.5	12.5	4.9	1.5	15.7	27.1	75.0	4.7	70.3	54.0	40.5		3.0	2.4	35.2	2.1
Rye	3.8	1.4	3.5	8.8	0.6	1.6	17.8	27.9	75.5	0.9	74.6	55.8	42.1		0.4	2.5	39.3	2.6
General average	8.7	1.3	2.9	12.6	2.3	1.5	16.5	26.8	73.2	2.4	70.8	54.2	39.6		1.5	2.2	36.0	3.0

approximate the following: total ash, 9; ether extract, 1; total protein, 3; water extract, 13; insoluble ash, 2; insoluble protein, 2; lignin, 17; pentosan, 27; holocellulose, 73; ash in holocellulose, 2; pure holocellulose, 71; alpha-cellulose, 40; ash in alpha-cellulose, 2; pentosan in alpha-cellulose, 2; pure alpha-cellulose, 36; remainder, 3.

The sum of the ether extract, water extract, insoluble protein, lignin, pentosan, pure alpha-cellulose and remainder totals 101 per cent.

From a comparison of the general average figures for the eight kinds of straw in Table 1, the following conclusions have been drawn:

1) The total ash, especially the insoluble ash, is much lower for straw from light soils than for straw from heavy soils. Apparently the uptake of minerals, especially silica, is much lower on light soils than on heavy soils.

2) Ether extract, total and insoluble protein, lignin and pentosan figures show only insignificant differences. Rye, however, shows somewhat higher figures for lignin and pentosan than do the other straws.

3) The water extract of rye is definitely lower than that of the other straws; also its pure holocellulose and alpha-cellulose figures are definitely higher.

4) The figures for the remainder show considerable variation which is not correlated with that for the other constituents. Obtained individually by subtraction of the values for seven other constituents from 100 (the pure alpha-cellulose, moreover, being obtained by subtraction of two values from a third one) and thus accumulating the errors of nine determinations, the figure is of little value by itself. Therefore, only the average remainder figure will receive additional consideration.

It seems in order to question the nature of the material covered by the remainder figures, the general average figure for all of these calculations being 3.0 per cent. In publication 2 (see appended list), some figures are given for the acetyl content of straw. These figures yield an average value of 3.5 per cent—a figure in the same order of magnitude as the general average figure of the remainder.[1] The acetyl content calculations were determined on raw straw.

The water extract of raw straw contains a little acetic acid—about 1.2 per cent. Also contributing to the remainder in an amount equal to about 1.0 per cent is the CO_2 of the uronic acids groups.

One important conclusion can be drawn from these data and that is that straw does not contain any hexosans except in the form of alpha-cellulose. (J. Sundam, *Pappers-och Travarutidskrift* for Finland 29, 113, 1947; *Svensk Pappers Tidning* 50, 371, 1947, has arrived at the same conclusion with regard to spruce wood on the basis of an analysis of the sugars present in bisulphite waste liquor.) Because of this finding, the term "hexosans non-cellulose," where used in former publications of the Experiment Station, must be corrected.

Publication 2, previously referred to, also includes some determinations of the carboxyl content of straw (boiling with 12 per cent HCl and collecting the CO_2 split off). It is assumed generally that these carboxyl groups are present largely, if not wholly, in the form of uronic acid anhydride. (Publication 2 contains a discussion of the literature on the subject.) The determinations on straw revealed a uronic acid content of 5—6 per cent.

In making a pentosan determination, the material also is boiled with 12 per cent HCl for a considerable time. Most, if not all, of the uronic acid anhydride, therefore, is included in a pentosan calculation. On this basis, in the case of the straw, practically all uronic acid residues were determined as pentosan.

5) It appears that the straw alpha-cellulose as prepared by the Experiment Station still contained some pentosan. This fact led to the hypothesis (already formulated by Young and Rowland[2] for softwood pulps) that some pentose anhydride and/or uronic acid anhydride units occur in the glucose anhydride chains of the cellulose molecules of straw. It is difficult to prove this hypothesis as it is almost impossible to prepare a chemically-pure cellulose from materials like straw and wood. However, it is the opinion of the Experiment Station that the alpha-cellulose preparations made from straw in this investigation closely approximate a chemically-pure cellulose. At any rate, the data given under the heading of pure alpha-cellulose were determined gravimetrically and corrected for both pentosan and ash.

6) Holocellulose is supposed to contain all cell wall constituents with the exception of lignin. This supposition certainly held for the preparations made from the ether-extracted and the water-extracted material of the straw.

To obtain further insight into the composition of these holocellulose preparations of straw, the sum of the

[1]The acetyl groups in materials like straw and wood are easily split off. Therefore, they are not included in the figures for either lignin, pentosan, or pure alpha-cellulose.

[2]Young, G. H. and Rowland, B. N., *Paper Trade J.* 97, T.S. 178 (1933).

percentages of the alpha-cellulose, pentosan and remainder[3] was subtracted from the percentage of holocellulose. These data based on figures for holocellulose as presented in Table 1 are presented in Table 2. In considering the difference figures of about 5 per cent throughout the tabulation, it should be stated that the holocellulose preparations contained some protein (average value of eight samples was 0.76 per cent), also the removal of lignin was not complete (average value of three samples was 1.53 per cent). Subtraction of these values from 5 per cent still leaves a difference unaccounted for of 2.7 per cent.

As outlined in publication 4 (see appended list), holocellulose probably may contain appreciable quantities of lignin breakdown products which go into solution during the lignin determination in this material. Therefore, this final difference of about 2.7 per cent of straw is assumed to be due to the occurrence of such breakdown products.

Similar figures on the holocellulose of wheat straw, although the cellulose was not prepared in the same way as outlined herewith, have been given by Schenck and Kurth.[4] Furthermore, it appears from their investigation that holocellulose is not a suitable raw material for papermaking. For this reason, and also on account of the uncertainty of its composition, the Experimental Station cannot attach much value to the holocellulose content of straw.

7) The water extract constituted an appreciable part of the original straw. In addition to the small quantity of acetic acid already mentioned (about 1 per cent), there are some organic nitrogen compounds (total protein minus insoluble protein) and a considerable amount of minerals. The amount of the latter, however, cannot be deduced from the total ash and insoluble ash contents since the total ash is determined as sulphate ash.

A sample of rye straw water extract gave an ash content of 2.7 per cent. The dry matter of this extract contained 1.1 per cent of lignin, i.e., material insoluble in 72 per cent H_2SO_4. It is doubtful however, whether this material must be considered as true lignin. The remainder of the dry extract consisted chiefly of soluble carbohydrates. As these products are so loosely bound that they go into solution upon boiling the straw with water, in the opinion of the Experiment Station, they cannot be considered as cell wall constituents.

To obtain a better insight into the correlative proportions of the cell wall constituents of the various straws for the years 1941 and 1942, calculations were made for lignin, pentosan, alpha-cellulose and remainder in per cent of both ether extract and water extract, and ash-free and protein-free oven-dry matter. Average figures for these calculations, rounded off to whole numbers, are given in Table 3.

There appear to be no significant differences in lignin and pentosan contents in the eight kinds of straw. The differences in the alpha-cellulose content, though somewhat larger, are hardly significant either, with the exception, perhaps, of the low value for summer wheat from light soils. Also, rye straw shows no noticeable differences from the other straws.

Rye straw is the most valuable as a fibrous raw material for paper pulps than the other kinds of straw because of its higher content of cell wall constituents, especially alpha-cellulose, and also because of its higher percentage of fibers longer than 1.4 mm. (see publication 7 in appended list).

The percentage of fiber longer than 1.4 mm. for the different straws, determined from a study of the mixed samples of the 1941 harvest, follow: summer barley, 17.3; winter barley, 16.2; oat on heavy soils, 20.6; oat on light soil, 18.1; summer wheat on heavy soils, 20.7; summer wheat on light soils, 11.8; winter wheat on heavy soils, 26.2; rye, 29.1.

[3]Regarding the subtraction of the remainder figures in making this calculation, it should be pointed out that pure holocellulose contains acetyl groups. An old sample of oat straw holocellulose contained 1.4 per cent of acetyl.

[4]Schenck, W. A. and Kurth, *Ind. Eng. Chem.* 33, 1398 (1941).

TABLE 2

Composition of holocellulose in per cent of oven-dry straw

Sample	Pure holocellulose	Sum of alpha-Cellulose, pentosan and "remainder"	Difference
Summer barley	71.3	66.2	5.1
Winter barley	71.0	66.3	4.7
Oats:			
From heavy soils.....	69.4	64.8	4.6
From light soils.....	69.0	65.0	4.0
Summer wheat:			
From heavy soils.....	69.9	64.5	5.4
From light soils.....	70.9	65.5	5.4
Winter wheat:			
From heavy soils.....	70.3	64.4	5.9
Rye	74.6	69.8	4.8
General Average	70.8	65.8	5.0

Summary

1) Figures are given for total ash and protein, ether and water extracts, insoluble ash and protein, lignin, pentosan, holocellulose, ash in holocellulose and pure holocellulose, alpha-cellulose, ash and pentosan in alpha-cellulose and pure alpha-cellulose for eight different kinds of cereal straw: namely, summer and winter barley, oat from heavy and light soils, summer wheat from heavy and light soils, winter wheat from heavy soils, and rye from light soils.

2) Totaling the percentages of various constituents of the straw leaves a remainder of 3 per cent which must consist of acetyl and carboxyl groups.

3) Cereal straw does not contain any hexosans other than alpha-cellulose.

4) Straw alpha-cellulose always contains some pentosan, presumably present as pentose (and/or uronic acid) units in chains consisting otherwise of glucose units.

5) Rye straw differs from the other cereal straws in a lower water extract content. Consequently, rye straw has a higher content of cell wall constituents, especially alpha-cellulose. This characteristic is of importance with regard to its use as a fibrous raw material for paper pulp and especially for rayon pulp.

Publications of the Netherlands Experiment Station for the Utilization of Straw

1) E. L. Ritman: Chemisch en morphologisch onderzoek van Nederlandsch Graanstroo. (Chemical and morphological

TABLE 3

Sample	Lignin	Pentosan	Alpha-cellulose	Remainder
Summer barley.....	20	33	44	4
Winter barley	20	32	44	4
Oats:				
On heavy soils.....	19	32	45	3
On light soils.....	20	32	43	4
Summer wheat:				
On heavy soils.....	20	33	43	4
On light soils.....	21	33	42	5
Winter wheat:				
On heavy soils.....	20	34	44	3
Rye	20	32	45	3
General average	20	33	44	4

investigation of Netherlands cereal straw) 1941.

2) E. L. Ritman: Nadere specificatie van de bestanddeelen van graanstroo (Closer specification of the constituents of cereal straw) 1941.

3) E. L. Ritman: Voortgezet chemisch en morphologisch onderzoek van graanstroo (Continued chemical and morphological investigation of cereal straw) 1942.

4) E. L. Ritman: Studies over het ontsluiten van graanstroo (Studies on the as a fibre-yielding material) 1942.

5) E. L. Ritman: Graanstroo als vezelleverende grondstof (Cereal straw as a fibre-yielding raw material) 1942.

6) F. M. Muller: Vezellengte en celstofopbrengst van plantaardige materialen (Fibre length and pulp yield of vegetable materials) 1942.

7) F. M. Muller, E. L. Ritman en J. Molenaar: Over de lengteverdeeling der elementen van graanstroo en andere landbouwafvalproducten (On the length distribution of the elements of cereal straw and other agricultural wastes) 1942.

8) E. L. Ritman: Papiertechnisch onderzoek van graanstroo (Paper technical investigation of cereal straw) 1942.

9) E. L. Ritman: Voortgezette studies over het ontsluiten van graanstroo (Continued studies on the digestion of cereal straw) 1943.

10) F. M. Muller, E. L. Ritman en J. Molenaar: Over de bereiding van aethylalcohol uit graanstroo (On the preparation of ethanol from cereal straw) 1943.

11) E. L. Ritman: Pakpapier uit graanstroo (Packing paper from cereal straw) 1944.

In Press

12) E. L. Ritman: Over de defibreering van graanstroo en de verdere verwerking der zoo verkregen producten (On the defibration of cereal straw and the further elaboration of the products so obtained).

13) E. L. Ritman: De vervaardiging van krantenpapier uit graanstroo (The manufacture of newsprint from cereal straw).

14) E. L. Ritman: Gecombineerde sulfaat- en monosulfietontsluiting van graanstroo (Combined sulphate and monosulfite digestion of cereal straw).

15) F. M. Muller: Over the verteering van celwandkoolhydraten door herbivore zoogdieren (On the digestion of cell wall carbohydrates by herbivorous manuals).

How Water Requirements for Sulphate Pulp Bleaching Are Met by Nekoosa-Edwards

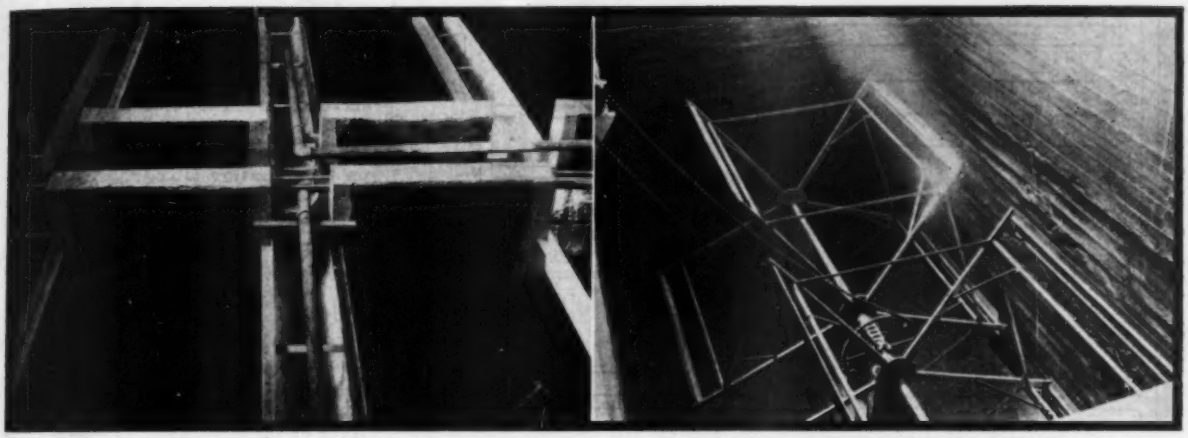
DR. TRUMAN A. PASCOE
Technical Director
Nekoosa-Edwards Paper Co.

▶▶▶ IN MODERN SULPHATE pulp bleaching, one of the most important requisites is a generous supply of low color-sparkling clear water. Therefore, the first step in planning the new Nekoosa-Edwards Paper Company bleachery at Nekoosa, Wisconsin, was to design and construct a filter plant to process Nepco Lake Water and to deliver it suitable for the bleaching process.

The new filter plant is located on the island between the Nekoosa Mill tail race and the main channel of the Wisconsin River. This location made it easy to connect the plant to the main raw water line which crosses the Wisconsin River under the Nekoosa dam at this place. This pipe line, a 42-in. concrete line, conveys water 4½ miles from Nepco Lake to the Nekoosa Mill.

The water treatment starts at Nepco Lake with the addition of alum as the water enters a large baffled earth settling basin. This basin has a capacity of 40 million gallons and provides about 18-20 hours of retention and

Interior of filter plant



LEFT—Palmer agitators or top washers . . . RIGHT—Filter plant coagulator

settling time. Leaving the settling basin, the water is screened, divided, treated with chlorine and ammonia, and started on its way to the Port Edwards and Nekoosa mills in separate pipe lines. This system of treatment and settling is well adapted to this particular water supply. It was originally designed only after extensive study.

The filter plant was designed with a capacity of 3,600 gpm by Infilco. This same firm also furnished all of the special equipment. The building, designed by Nepco's Engineering Department, was constructed by the Frank Henry Construction Company.

The design provided space for four 28 ft. x 16 ft. filter beds, two on each side of the ground operating floor. Space was provided in one end of the building for a pump room, switchboard, laboratory bench, and operator's desk. The basement space between the beds is used as a pipe gallery.

Only three of the four units were fitted as two-bay filter beds, the fourth was fitted as a coagulator basin.

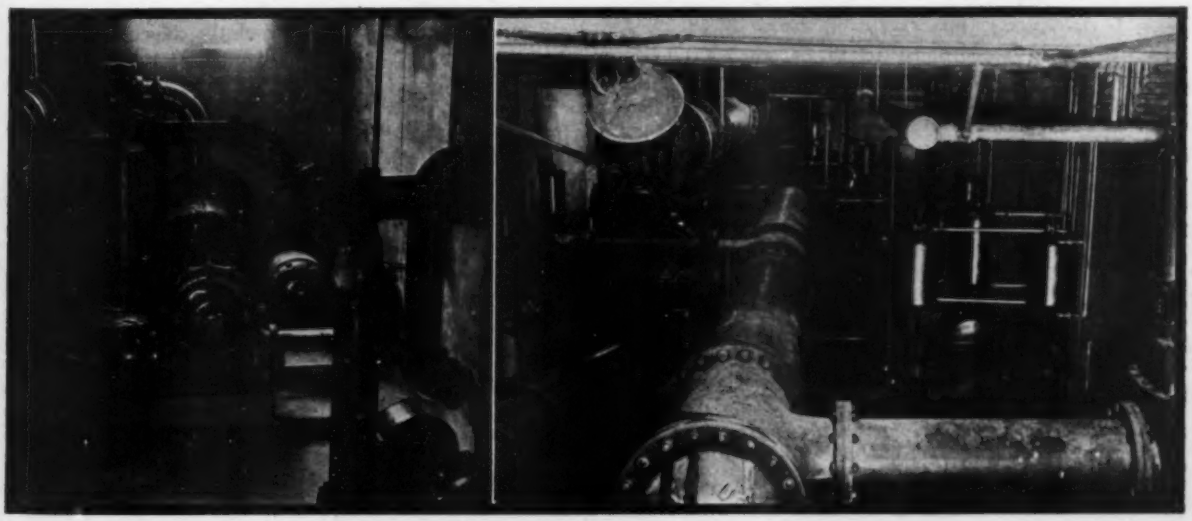
The space under the three fitted filter beds and the pipe gallery is used as a clear well. This well has a capacity of 65,000 gallons.

This general design will allow subsequent expansion by duplicating the equipment of the present plant and by building on to the end of the present building. When such expansion takes place, the coagulating basin will be fitted as a filter bed. Also, a coagulator unit will be placed in the corresponding position in the new building. In this manner, four new filter beds will be added and the capacity of the plant increased to 8,400 gpm.

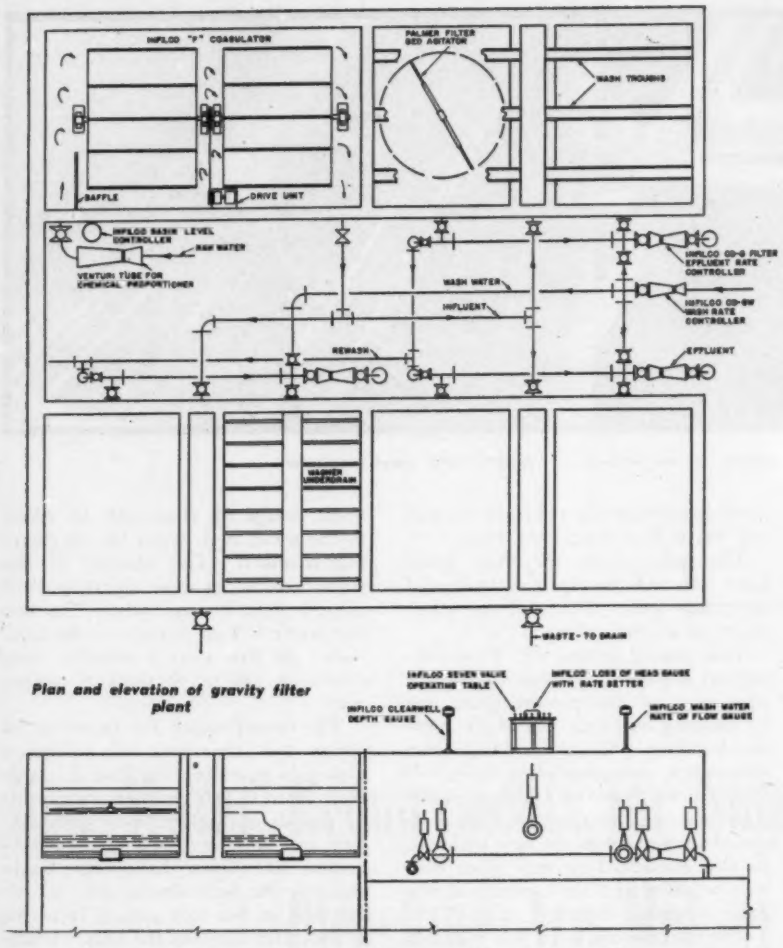
The coagulating basin was included in the original design for two reasons. The first reason was that there are frequent periods when the color of the raw water in Nepco Lake is sufficiently low (33 ppm or lower) to dispense with the alum treatment for all of the water used. During such times, a small dosage of alum will be added to the water as it enters the coagulating chamber. The addition of the alum, assisted by slow agitation, will cause a light floc to form. The floc and water will go directly to the filter beds. In this way, a suitable color reduction will be obtained at modest cost.

The second reason for favoring the design was the result of experience gained in operating the Port Edwards filter plant. This experience revealed in periods of highest water temperature and most favorable settling conditions at Nepco Lake, the water reached the beds almost free of the remnant of floc that goes to form the active filter layer on the beds. Under these conditions, the addition of a small amount of alum just before the filters regenerate sufficient floc for optimum color removal by the beds.

The purpose of dividing each filter bed into two bays was to facilitate washing. The size of the washing



LEFT—Pump room of filter plant . . . RIGHT—Pipe gallery of filter plant



Plan and elevation of gravity filter plant

pumps, the piping and the amount of water required at one time was reduced substantially by the adoption of this arrangement.

Water from Nepco Lake is brought into the coagulating basin through a venturi proportioner and a basin level controller. The former instrument controls the rate of alum feeding to keep it strictly proportional to the flow through the plant. The coagulator agitators hastens the formation of the alum floc and causes the floc to gather together and grow.

A standard solution feeder supplies the alum from two small wooden storage tanks, which in turn are connected to the mill alum solution system. An alum solution of two pounds per gallon concentration is used. An automatic shut-off stops the alum feed in case the water flow through the plant is interrupted.

The water flow from the coagulator basin is divided to supply the three filter beds. Each bed is equipped with a filter rate controller. These devices are set nominally for a rate of 1,200 gpm but are capable of adjustment of from 50 to 150 per cent of this rate.

The maximum rate is set for each bed at its control table. Governed by the depth of water in the clear well, each bed operates at this set rate or some lesser rate down to the point where a full clear well will have gradually reduced the flow to a very small value. Dropping the level in the clear well gradually reopens the controller valves to a maximum of the set flow rate.

An automatic reset furnishes further protection by closing the influent controller valves whenever the effluent valve is closed, thus preventing a sudden inrush of water when the effluent valve is opened again. This control system also prevents a clean bed from assuming more than its proportional share of the load.

Each filter bed is provided with a loss-of-head gauge to indicate its operating condition with respect to need for washing.

All valve operating mechanisms for each bed have been brought together on an operating table. "Gear shift" type levers actuate the hydraulic mechanisms that operate the main valves. The open or closed position of each valve is shown by indicators on the operating table.

The under drains in each filter bed consist of a central Transite header and smaller laterals at two foot intervals.

The header has a capacity of a 12 inch pipe and each manifold and lateral is drilled to provide holes on six inch centers. An umbrella type of distributing nozzle is provided for each hole in the manifolds. The holes in the laterals are turned down to break the force of the wash water by hitting the floor.

The floor areas around the manifold-lateral system is filled in with "Wagner Blocks." These blocks form a general false bottom effect for the collection of water when filtering or for the distribution of wash water when back washing.

The filter medium in each bed consists of 41 inches of size-graded Anthrafilt—ranging in size from 1⅝ inch to 3/16 inch. With the use of Anthrafilt as the filter medium, it is necessary to use Palmer filter bed agitators. These devices are of the self-propelled, revolving type, and are drilled to furnish vigorous jets of water to break up and cleanse the top of the bed during rewashing.

Anthrafilt filling and Palmer washers were chosen on the basis of eight years of experience in the Port Edwards filter plant. This experience on the same water supply showed that this medium removes more water color than sand, that the beds remain clear without mud ball or other dirt accumulations over long periods, and that the filter rate can be varied over a much wider range without impairing the quality of the effluent water.

The system for washing the beds consists of a separate pump, a wash rate controller set for a normal rate of 2,450 gpm, and a wash rate gauge to guide the actual operation.

The anticipated performance of this plant can be summated by stating that if a raw water with color of 30-35 ppm and with no turbidity is treated, the effluent should show a color of 10 ppm or less. More color removal at the lake, say down to 20-25 ppm, will result undoubtedly in an effluent with a color of five ppm or less. These predictions are based on experience gained in operating the much older filter plant on the same water at the Port Edwards mill.

Contract Problems Under The Taft-Hartley Act

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Research Institute of America

▶▶▶ THE THIRD ROUND of pay hike demands which unions will make in your industry and in every other industry in America during the next few months will confront employers with more than a labor cost problem. For the first time, management will be brought face to face with the realities of the Taft-Hartley Act. Press and radio comments on the new labor law spotlighted bans on the closed shop, featherbedding and union administered welfare funds. But that isn't the whole Act—not by a long shot. The fact of the matter is that the Act does impose restraints on labor organizations—but it also imposes a number of serious obligations on management. Just to give you an idea: A compilation of union contract clauses published by the U.S. Bureau of Labor Statistics lists more than a dozen different types of check-off clauses in use in collective bargaining agreements today. Yet, the Taft-Hartley Act prescribes certain limitations on the check-off arrangement which may be made by the employer, employee and union. An employer who willfully violates this section of the new Act may be guilty of a misdemeanor and subject to a fine of more than $10,000 or to imprisonment for not more than a year, or both. Consequently every existing check off clause will have to be reexamined, and probably rewritten.

The Taft-Hartley Act is sprinkled throughout with similar examples of legal nicety and practical nuisance. Every company that is about to negotiate a renewal, modification, or extension of its present union contract must put itself on notice of the pitfalls in the new Act before signing on the dotted line.

Confusion and conflict over the meaning of the Taft-Hartley Act is to be found at every level of union, industry, and government administration. Of course, a good deal of this fog will be cleared away once the courts get down to the business of interpreting the new provisions and the amended provisions of the Wagner Act. But employers can't wait for judicial interpretation. If you have to negotiate and sign a new union contract now, you have to take the risks of action. You should know how and where to minimize them.

Two weeks after passage of the Taft-Hartley Law, John L. Lewis signed a contract with the coal operators. When terms of the agreement were announced, Representative Hartley, co-author of the new law, burst into print with the statement that some of its provisions were prohibited by the statute. To add to the confusion, Senator Taft countered with a statement in which he practically said no, the contract is okay. With the parents of the new baby unable to identify their offspring, what are your chances?

Here are samples of a few of the really tough problems raised by the statute which are bothering employers from coast to coast:

1) Does the 60-day notice provision apply to an existing contract? Who must give notice? When does the time start running?

2) Do I have to bargain with a union which hasn't filed the non-Communist affidavits required by the Taft-Hartley Law?

3) Does the third round of wage negotiations affect the closed shop or maintenance of membership provisions in present contracts?

4) Has the automatic renewal clause in my present contract been affected by the Taft-Hartley Act?

5) Can I agree to a checkoff of union dues which will be good for the entire term of the contract?

6) Can I legally notify my employees of their right to withdraw from the union under an escape clause?

These are irritating questions on which you may have to take a position now, even though administrative and judicial interpretation may not be forthcoming for months or years.

60 Days Notice

There is already considerable argument surrounding the 60-days notice required by the Taft-Hartley Act. At every seminar, panel discussion and round-table conference on the meaning of the new law, this question has arisen: When does the 60-day period start to run? The law provides that no party to a collective bargaining contract covering employees in an industry affecting commerce shall terminate or modify the contract unless the party desiring such termination or modification takes the following four steps:

1) Serves a written notice on the other party of the proposed termination or modification 60 days before the expiration date. If the contract contains no expiration date, the notice must be served 60 days prior to the time of the proposed termination or modification.

2) Offers to meet and confer with the other party for the purpose of negotiating a new contract or a contract containing the proposed modifications.

3) Notifies the Federal Mediation and Conciliation Service within 30 days after such notice of the existence of a dispute, and simultaneously notifies the State Mediation agency if no agreement is reached by that time.

4) Continues in full force and effect, without strike or lockout, all the terms or conditions of the existing contract for 60 days after the notice is given, or "until the expiration date of such contract, whichever occurs later."

Existing contracts are affected by the 60-day notice provision in a variety of ways. The variation of the statutory impact depends upon the contract language. You will understand how the provision works if you bear in mind the purpose of the section. The aim of the notice is to set a 60-day period in which the parties can discuss their proposals without an immediate strike threat over their heads. Let's examine some typical situations:

1) Suppose a contract expires on a definite date and neither party gives notice of an intent to change the contract 60 days before that expiration date. What happens to the contract after the expiration date? Can notice be given at any other time? The consensus of opinion is that the contract remains in effect indefinitely—until one of the parties does ask for a change. The terms of the old contract control until 60 days after the notice is finally given. Until that time neither party can resort to economic force such as strike, lockout, or unilateral change. This differs radically with the common law concept of contracts and their status after expiration. But remember that common law rules aren't controlling in interpreting collective bargaining agreements.

2) Suppose a contract contains an automatic renewal clause requiring notice of an intention to terminate 30 days before the specified date. When

must notice be given? The answer to this one depends upon what you want to do with the existing contract. If you don't want to make any changes or terminate your present contract, then, of course, you won't give the 30 days notice, but will let the contract automatically renew itself, or wait and see whether the union gives notice. But get this clear in your own mind. If you don't give the 30-days notice required by the language of the contract and the union doesn't exercise its right to give a notice, then you'll probably be bound to a renewal of the agreement as it stands for such period as the contract specifies. On the other hand, if you want to give notice, you certainly have to comply with the 30-days requirement of the contract. But what about the statutory 60-day notice requirement? You might give the notice 60 days in advance of the contract anniversary date, and give the 30-day notice, too. Or you can merely give the 30-day notice required by the agreement and let that stand as the 60-day notice also.

3) Does the 60-day notice requirement apply to a wage reopening clause which permits reopening on a specified date? It would appear to apply if any bargaining at all is involved. If the provision merely calls for the application of an escalator clause, the change is automatic without notice. However, if the clause itself sets forth a notice provision, it must be followed. For example, if the contract merely says that it may be opened for wage negotiation on a certain date and you want to make a change, safe procedure would dictate giving notice 60 days before the date specified. The same would apply to any notice required of the union. The statute isn't clear in this situation and it doesn't pay to be technical. It can reasonably be argued that the date set forth in the contract is the date on which negotiations are supposed to start. Only a lawsuit could definitely determine the answer. But if you get a 60-day strike-fee period following the notice, that would seem to be adequate compliance with the statute.

Left-Wing Unions

Communist or left-wing unions raise another problem for many employers. The National Labor Relations Board and its General Counsel have been slowly picking their way through the statutory labyrinth that Congress set up for the Communist leadership in trade unions. But businessmen, industrial relations counselors, and personnel directors need to know the way through this maze now. In effect, the Taft-Hartley Act bars the use of NLRB machinery in election proceedings and in unfair labor practice cases to unions whose local and international officers fail or refuse to file affidavits stating that they are not Communists. What does this mean to employers, particularly those dealing with the United Steelworkers, CIO, United Electrical Workers, CIO, and the United Mine Workers, Independent? These are the three big powerful international unions which have refused to file the affidavits required by the statute.

To deal or not to deal with unqualified unions? A good number of employers face this question. In a good many cases, they know that the union, though barred from the Labor Board machinery, actually represents a majority, and that failure to renew a contract or negotiate one may mean a costly strike.

Confounding the confusion on this issue are two parallel NLRB policies, which appear to cancel one another out. On the one hand there is a well-established rule dating back to cases decided under the old Wagner Act, that majority representation of employees, not formal NLRB certification, is the vital factor which determines an employer's obligation to bargain with a union. Pitted against this you have the Board's recent rulings that it will not certify a union which hasn't filed the non-commie affidavits; that such a union can't get on a formal NLRB election ballot; and that the Board won't hold an election based on an employer petition where the only union demanding a contract is an unqualified one. Unfortunately a misquoted statement of Mr. Denham, NLRB General Counsel, has further served to muddy the issue. The press reported him as saying that an employer dealing with an unqualified union does so "at his peril." Mr. Denham issued a clarification, but in the meantime a great deal of damage had been done.

The average employer must ask himself: How much loyalty does the union command among the employees? If it lacks a majority, dealing with it is illegal in any event. Faced with a majority, then:

1) Find out why the international or local has not complied. Some internationals such as the CIO Steelworkers and the United Mine Workers want to test the law in the courts. They are not leftwing. They can qualify at any time which suits their purpose. Some local unions, like some businessmen, don't bother to fill out government forms until they have to. But some unions have not filed for fear of investigation.

2) If only one union is involved and it's a newcomer at your plant, you can agree to a poll by an impartial person or agency to determine its majority standing. This may turn out to be a good deal less costly than a recognition strike.

3) If you are now under a contract with a non-complying union, it's safest to continue carrying out the terms. The union may not be able to bring a refusal to bargain charge, but there's nothing to prevent it from suing for breach of contract in the courts.

4) If a contract with a non-complying union has expired and you are negotiating a new one, breaking off negotiations doesn't seem to make good sense unless you have a reason to believe that it no longer commands support from a majority of the workers. You might take this tack. Impress the union with the problems and the risks it will take if it faces long drawn-out negotiations. You might get them to trade or yield some of their demands for a quick wrap-up of the deal.

5) If another union appears to be signing up your workers with an eye to demanding recognition, you might insist on formal NLRB intervention to protect yourself.

Discharging Communists

The Communist problem can tie you up at all stages of the game. For instance, can an employer fire employees merely because they are Communists or fellow-travelers? The answer to this in large measure depends upon whether you have a union contract or not. An employer who is not operating under a collective agreement can fire for any reason or no reason—except for union activities or union membership. A unionized employer can fire only within the limits set down by his contract. In most cases this means only "discharge for cause."

There are very few guideposts on the meaning of "cause." In two cases arbitrators refused to okay discharges based on Communist membership per se, even though in one of these cases the employer claimed that the worker used the channels of the employer's organization to spread Communist propaganda.

This employer recently changed its contract with the union to include this clause: "Any person who in the course of the performance of duty as an employee of (name of employer) wilfully fails to carry out the employer's program or who wilfully carries out any program other than that of (name of employer) may be charged with malfeasance."

In this 1948 presidential year when the left-wing unions plan to exert political pressure, it might be a good idea to write into your contract a clause like the one above. At any rate, come to some understanding with the union that any activity by a Communist which impinges upon the policy or operations of the company, or creates ill will

among your suppliers or customers, or directly impairs the worker's usefulness on the job or lowers morale or discipline in the plant is proper cause for discharge.

Keeping Workers Posted

One thing, the Taft-Hartley Act does seem to settle in favor of management. It appears clear that an employer may tell his employees what rights they have under the law as it now stands. This is part and parcel of his right to speak his mind on unionism and particular unions—provided his statements contain no threats or other coercive remarks. For example, an employer can now advise his workers that (a) they may refrain from joining a union unless there is a legal union or closed shop; (b) may not be discharged at union request except for non-payment of initiation fees or dues; (c) may seek decertification of the union if 30 per cent of the employees cooperate in the signing of a petition.

There is one pitfall in this course of action: there is always a psychological temptation to say more than the law allows. You might, as a matter of company policy, want to advise employees when they can resign from the union under an escape clause, or when they have a right to withdraw a check-off authorization. If you finally decide to convey this kind of information, avoid taking any steps which might be interpreted by the employees as your suggestion that they do so. For example, avoid circulating resignation forms. Some misguided foremen might attempt collection of these forms. Such activity, from a member of the management hierarchy, might be interpreted as a form of coercion by NLRB. If you are going to post your workforce on the rights they have under the contract, tell them what the contract says, what it means, and let them determine their own course of action.

Union Security

The Taft-Hartley Act has outlawed the closed shop—at least in all new contracts after August 22, 1947. Employers may, if they so choose, negotiate a union shop contract. This provision of the statute has really turned out to be a boomerang for most employers. Management willing to grant a union shop can't get a contract signed, sealed and delivered until NLRB holds a referendum. What's more, Labor Board statistics covering these elections show that employee approval of the union shop authorization is overwhelming. For instance, December 1947, figures released by NLRB show that 521 such elections were held, in all but three, union shop approval was voted, 90 per cent of the employees cast ballots and 93 per cent of these favored the union shop. With this kind of support, unions are not likely to comprise their union shop demand.

The union security problem is further complicated by state law variations on the federal union security theme. To date at least four states have adopted laws which differ from those of the Taft-Hartley Act. These are Colorado, Kansas, New Hampshire, and Wisconsin. Until the boundaries of federal and state jurisdiction over unionization are marked out, discretion would seem to dictate these steps, if you're covered by the Taft-Hartley Act:

1) Don't grant the closed shop. The federal law prohibits it. And this probably applies even in states which permit the closed shop if local voting requirements are met.

2) Insist that the union comply with both state and federal law if you are in a state which requires a vote before union security can be negotiated. It may be that the union will not be able to meet the more restrictive legislation.

3) Secure from the union a contract commitment that it will reimburse you for any damages suffered by executing the security agreement or discharging employees under it if it should be held to be illegal under State or Federal law.

4) Provide for cancellation of the union security provision in the event it is declared illegal.

Hiring Hall

Present demands by some unions for a hiring hall clause is another offshoot of the ban on the closed shop. In some industries provision is being made for hiring by individual employers according to seniority in point of service in the industry. This is being done on the West Coast between the Pacific American Shipowners Association and the Sailors' Union of the Pacific, AFL. Interestingly enough, both sides to this agreement discussed the subject with Senator Taft before making the deal.

Here is a clause worked out by the Joint Board of Milk Wagon Drivers' unions in the New York Metropolitan area in an attempt to meet the Taft-Hartley Act restrictions:

"Whenever additional employees are required, the employer shall immediately notify the union of such need, and said notice shall be given at least 48 hours before the employer interviews any applicant; except in the event that the union upon request of the employer is able to send applicants for the interview sooner, in which case, the employer is free to interview both union and non-union applicants, and except in an emergency, in which case the union will cooperate in all reasonable respects to assist employer in maintaining normal operations. Without discrimination as to any applicant by reason of membership or non-membership in the union or in any other respect, the employer shall permit all applicants furnished by the union to submit their qualifiications for the available positions, and subject to the foregoing, the employer after the 48-hour period shall have the right in his absolute discretion to hire or reject any applicant without recourse, it being understood and agreed however, that all employees on the company's seniority list shall be rehired as above provided before other applicants are considered."

Validity of this clause may rest not upon the way in which it is written but in the manner in which it is put into practice. Union preference which results in actual continuation of the closed shop won't be protected by such a clause.

Check-off

Heavy penalties imposed under the New Federal Labor Law make it imperative that you know the rules on check-off of union dues. Before you can deduct them from the workers' wages, you must get a *written assignment from each employee*. Moreover, the individual must have a chance to revoke his authorization at the end of a year, or at the end of the contract term, whichever is earlier.

You may want to write a contract for more than a year. What do you do about the check-off then? Even if you make a long-term contract, including a check-off, for a term longer than one year, the right of individual employees to withdraw the check-off consent must be preserved. But the statute does not say that you must get renewals of authorization every year. You may continue deducting the dues even beyond the year until such a time as the individual exercises his right of revocation. Working out this kind of deal may be better for you than demanding new authorizations each year. This would only put a fire under the union to conduct an annual authorization drive.

If your contract was made before June 23, 1947, and expires before July 1, 1948, you can carry out the check-off without bothering about individual consent. You need worry about the Taft-Hartley Law only when the contract is renewed or a new one is negotiated. Where the check-off was instituted before June 23, 1947, and extends beyond July 1, 1948, you may deduct dues without individual consent up to the latter date. But from then on you must observe the law. You will also have to keep your state law on check-off in mind. Most of them are like the federal statute. But watch out for state laws that regulate the *assignment* of wages. The Taft-Hartley Law

requires a "written assignment." Congress undoubtedly was thinking of assignment as an authorization or consent rather than the legal transfer of property. But the states might apply their strict rules on assignment of wages to check-off arrangements. You should take a look at your local law covering the assignment of future wages before you work out your check-off provision.

No-Strike Clauses

After Congress facilitated suit against unions for breach of contract, the first reaction of organized labor was "no more no-strike clauses." Instructions poured out of the mimeograph machines from every International to local unions advising rejection of any no-strike clause in future contracts. The primary union objective was to avoid damage suits authorized by the law. Nevertheless, compromise no-strike clauses are being signed despite AFL and CIO denunciation of the damage suit provision.

For employers, the no-strike clause, even when it was unenforceable, was of real psychological value. It gave considerable certainty of undisturbed operations. Union leaders used such a clause to keep their own rank-and-file in line when workers pressured for strikes on minor disputes or where political demonstrations were sought.

Now, more than ever, it is important that employers move effectively to counteract union fears of nuisance damage suits. As an illustration of what can be done, here is the settlement on union responsibility worked out by International Harvester in return for a damage suit waiver. It got from the United Automobile Workers (CIO) an agreement which provided for: (1) Union expression of the desire to avoid strikes and work stoppages; (2) Union recognition that the contract grievance procedure is adequate for a fair and final determination of all contract grievances; (3) Possible union review of any disciplinary action taken by the company against employees who strike or slowdown instead of filing grievances; (4) Release of the company from any obligation to bargain with the union concerning strikers if all steps of the settlement machinery were not used before the strike; (5) Union promise to direct strikers promptly to return to work in the event of a walkout, caused by a grievance which is arbitrable; (6) A union agreement to take reasonable and appropriate steps to terminate the walkout if the company feels that the union's order to return has not been effective.

In order to sell the union on the idea of the no-strike clause, you will have to draw a line of distinction between the authorized and unauthorized walkout. If a concession must be made along the lines of a damage suit waiver clause, that provision should exempt the union from liability only in the event of *unauthorized* stoppages, and then only on the condition that the union makes every reasonable effort to terminate the stoppages within, say, 24 hours; and publicizes to the workers that the walkout is without union approval or authority. If you limit union responsibility to authorized strikes, write into the contract your authority to discipline wildcatters, including the right to fire them. As an alternative remedy, you might also assert your right to substitute a specified fine or suspension. A good draftsman will include a broad definition of the term "strike," so as to cover slowdowns and other interruptions of work.

A word of caution on any union proposal that all government machinery be bypassed. One large radio manufacturing company has agreed to such a clause with the United Electrical Workers, CIO. Its major effect will be to show the company's good will toward the union. While the right of a contracting party to waive damage suit rights is probably based on good legal precedent, NLRB has ruled in the past that its right to prosecute cannot be waived by private parties. So, in the last analysis, what the company says in its contract won't prevent the Labor Board from prosecuting unfair labor practice cases if it believes that it has a case.

Welfare Funds

In enacting legislation to restrict payments by employers to unions, Congress has complicated the problem for employers. In dealing with contributions to union welfare and pension funds, three different rules are applicable:

1) The Taft-Hartley Act doesn't apply at all to funds established under union contracts before January 1, 1946, except where the fund provides for pooled vacation benefits. In this latter case, company exemption applies if the fund was established prior to the period beginning with January 1, 1947.

2) The Taft-Hartley Act provisions do not apply to welfare funds or pension plans established under union contracts, between January 1, 1946, and June 23, 1947, until expiration of the existing agreements, but no later than July 1, 1948.

3) The statutory provisions do apply to all new contracts entered into after June 23, 1947.

All this means that if you are negotiating a new contract this spring you will have to see to it that any welfare plan which is set up provides that all payments to the union will be held in trust for the purposes specified in the law—and only those purposes. You will also have to see to it that the plan provides for equal representation in the administration of the fund by the company, employees, and some neutral person. Of course, the statute does not apply to any company-sponsored and financed insurance plan.

Retroactive Dates

One very practical phase of contract negotiation which receives little attention but which is full of dynamite is the dating of the contract. Most employers know from experience that it takes time to work out a new agreement. Very often terms aren't reached for weeks or months after the old contract has expired. Unions always insist and most often receive retroactive contracts. Dating back the new agreement to the expiration date of the old one has its advantages. It eliminates the pressure at the bargaining table and gives the negotiators a chance to deliberate.

Due to carelessness or lack of information, it is too often assumed that retroactivity applies only to wage increases and that disposition of back pay gets rid of all problems. Don't forget that weeks or months of negotiation may witness changes in personnel. If this happens, you may get into the problem of seniority, transfer rules, promotions, vacations, etc. This has turned out to be a costly mistake for a number of employers. Some arbitrators have given retroactive effect to all provisions of the contract. Avoid this by indicating which provisions are retroactive, which ones date from the execution of the contract; that only wage provisions apply retroactively and that all other provisions are effective as of the date the contract is signed.

A Review of the Literature on Sizing - Part III

EDWIN SUTERMEISTER

▶▶▶ AN ASSORTMENT OF notes relating to various methods of sizing are collected under this heading. The majority of these are from notices of patents, and for this reason they are doubly difficult to evaluate. Since hardly any two of these cover the same or similar subjects, it is impossible to generalize about them. Several of the methods appear to have no direct bearing on rosin sizing, and are mentioned here because they are credited with being sizing processes, and for the suggestions they may offer for future lines of work.

Methods of Sizing

O. Strecker (Ger. pat. 536784, Feb. 26, 1930) finds it advantageous to add reducing substances to the stock in the beater chest. The compounds recommended are those of di- and tetra-valent sulphur, such as sulphites, thiosulphates, hydrosulphites, etc.

According to N. Ivanov (*Bum. Prom.*, Aug.-Sept., 1930) the Khinchin sizing process consists essentially in adding 0.4 to 0.8 per cent of soda ash to the beater after adding the size.

According to J. Glatz (Fr. pat. 695626, May 1930) sizing is effected by adding a sodium, ammonium, or other salt of the glycolic acid of cellulose soluble in water, or homologous compounds, or a substance such as starch having an affinity for cellulose.

In sizing filled papers, H. R. Rafton (U. S. pat. 1810728, June 16, 1931) adds alum to the mixed fibers and filler so as to permit only a brief period of contact before the paper is formed.

K. Kanamaru (*Jour. Soc. Chem. Ind.*—Japan, April, 1931) reverses the sign of the charge on the fibers by deposition of alumina, and the positively charged fibers are then immersed in rosin size solution. The process is tedious from a practical standpoint, but better sizing is said to be obtained.

For sizing fibrous materials for use in fiber board G. F. Davis (U. S. pat. 1889642, Nov. 29, 1932) suspends the dry, bulk fiber in a gaseous medium, such as air, and sprays it with a sizing agent, such as rosin size. The fibers are then suspended in water and used for making such products as fiber board for heels, etc. The process relates chiefly to leather, but may also include wood, cellulose and other fibers.

An outline of the properties and merits of ammonium alginates in paper and board making is given by an anonymous writer. (*Papeterie*, Oct. 25, 1932).

B. Johnsen (U. S. pat. 1903236, March 28, 1933) proposes a method in which the sizing material is added to the stock during its travel on the fourdrinier wire.

M. Robinov and P. Zatov (*Bum. Prom. 12*, No. 1:64-67, 1933) propose to use the waste liquor from the unhairing of skins for sizing paper. It is neutralized with sulphuric acid, and the precipitated proteins used for the sizing agent.

E. Richter (*Wochbl. Papierfabr.*, 64, No. 34, 595 (Aug. 26, 1933) gives a general discussion of the use of latex in paper, mentioning the quality of the latex according to its origin, its use in paper stock, and the most suitable conditions for its employment.

According to *Aktiebolaget Defibrator* (Fr. pat. 768181, Feb. 5, 1934) a sizing agent, e.g., paraffin wax having a melting point of about 50 C. is added to the wood chips, or other cellulosic material, which is defibered at a temperature above the melting point of the sizing agent.

Regarding sizing with montan wax, F. W. Althoff (*Papier-Fabr.*, Sept. 16, 1934) states that the size has extremely fine particle size, is of unusually high uniformity, and is stable at all temperatures in hard water within a large *p*H range.

B. Wieger (*Tech. Assoc. Papers 18*, 447, 1935) describes the Bewoid system of sizing and claims it is not influenced by hardness of water, degree of acidity of stock, or order of addition of size and alum. It is said to improve the finish, give less fuzz, and better color and more durable paper. It is not possible to size with 100 per cent dispersed rosin; part must be present as alkali resinate.

J. A. DeCew (Can. pat. 352422, Aug. 20, 1935) causes ammonium resinate and alumina to react in paper stock to produce an alkaline precipitate of hydrate of alumina and rosin hydrate. Alum may be neutralized with ammonia and the alumina added with the size. The hydrated alumina will combine with the ammonium resinate. After drying the paper, the alkalinity disappears and the paper becomes neutral and sized. Very similar to this is the process of W. A. Nivling (U. S. pat. 2138325, Nov. 29, 1938) who subjects the web-forming fibers to the action of an aqueous bath containing colloidally dispersed aluminum resinate, a protective colloid, and ammonia to keep that part of the batch in contact with the fibers at a *p*H of at least 6.5. Drying the web to remove water and ammonia produces a substantially neutral paper. The difference between these two seems to be that DeCew's is supposed to size carbonate filled paper, while Nivling's makes no mention of the effect of fillers.

For sizing photographic papers, G. T. Lane (U. S. pat. 2059880 and 2059881, Nov. 3, 1936) passes the paper through a stream of flowing live steam and then immediately through a relatively cool sizing bath. The two patents cover method and apparatus respectively. J. C. Trahey (U. S. pat. 2129249, Sept. 6, 1938) suggests an improved apparatus, and later (U. S. pat. 2143809, Jan. 10, 1939) mixes the steam with a controlled quantity of air to regulate the amount of air in the paper as it goes to the size bath.

C. R. Outterson (U. S. pat. 2055799, Sept. 29, 1936) adds to the stock in the beater completely saponified rosin, then a size emulsion containing unsaponified rosin, or other sizing agents, and finally precipitates with alum.

To prevent liberation of carbon dioxide, an alkaline reagent, such as sodium phosphate, silicate, hydroxide, or borax is added to the stock just before delivering to the paper machine. This patent (U. S. 2050262, Aug. 11, 1938) was issued to L. M. Booth.

According to Becker & Co. (Fr. pat. 825086, Feb. 23, 1938) the stock is mixed with an aqueous rosin dispersion stabilized by a small proportion of glue or gelatin, and then precipitated by a material such as alum. The dispersions may also contain small amounts of alkali and synthetic resin or wax. This appears very much like British patent 481098 (Feb. 28, 1938) to H. Grashof.

R. F. Ruthruff (Can. pat. 373841, May 17, 1938) coats and sizes paper with a resinous plastic polymer of

butylene or isobutylene, dissolved in a volatile solvent.

According to G. T. Lane and R. W. Paters (U. S. pat. 2136110, Nov. 8, 1938) paper pulp before its formation into a sheet is treated with certain vinyl resins, such as the water soluble type produced by the reaction of an aliphatic aldehyde with polyvinyl alcohol.

Experimental Data

Of all the papers mentioned in this review, those in this section are probably worth the greatest amount of study because they include the facts brought out in a considerable number of carefully conducted tests. The data presented, interpreted in the light of the theoretical considerations in the next section of this review, form the basis on which future improvements in sizing must rest. There is certainly much in these papers which should be given very careful thought.

In regard to the Bewoid process, B. Wieger (*Paper Maker and British Paper Trade J.*, 82 No. 2, XXXIII, 1931) says that the optimum size of rosin particles lies between the colloidal and the coarsely dispersed states. The smaller the particles in the beginning the more rapidly they grow and the shorter the time for coagulation. With molecularly dispersed rosin, coagulation by alum is too rapid to insure maximum sizing effects.

H. A. Harrison (*Paper Maker and British Paper Trade J.*, April, May, June 1932) made a very careful study of the sizing of unfilled chemical wood pulp papers, determining the water resistance by the dry indicator method. The sheets, made on the English sheet machine, were dried by intermittent application of heat, seasoned, and tested at 65 per cent relative humidity. He found the effect of beating negligible in comparison with that of rosin. The longer the time of contact of the size—up to 30 minutes—before adding the alum, the better the sizing; the time of contact of the alum should be at least 15 minutes. Adding part of the alum before the size was harmful; the consistency at which the pulp is sized is without effect. Dilution of the size before adding it to the sulphite fibers is beneficial. With kraft pulp sizing at 40 and 17 Fahr. gave about the same results, but at 55 deg. sizing was inferior unless enough alum was used to bring the *p*H down to at least 3.7. With unbleached, unbeaten sulphite with 4 per cent size, increasing the alum to a *p*H of 3.8 increases the sizing; above that amount it is injurious. Similar results were obtained with kraft pulp and beaten and bleached sulphites. Preliminary treatment of the pulp with alkali or acid does not affect the sizing provided the final *p*H is the same. He believes the reduction of strength on sizing depends on the fineness of the rosin particles.

An anonymous writer (*G. M. Papeterie*, Oct. 25, Nov. 10, 25, 1932) makes a graphical study of the stages of sizing, showing the effects of each of the factors.

O. F. Neitzke (*Paper Trade J.*, Nov. 3, 1932) finds, from laboratory tests on bleached sulphite with no filler, that 65 lb. of wax size (20 wax-80 rosin) nearly always equals 100 lb. of rosin size. He found that rosin size when added to the stock in the thick condition was as effective as when emulsified in a large amount of water before use. Sizing tests in these experiments were with Waterman's ink at 70 Fahr. Penetration time increased with increase in the temperature of drying from 70 to 250 Fahr. at all these temperatures, wax sizes were superior to rosin sizes. Maximum sizing was within the range of 20-40 per cent wax to 80-60 per cent rosin.

Ecke (*Papier-Fabr. 31*, Tech.-wiss. Teil 667, 1933) reports on practical mill experiences and tests made to eliminate operating troubles.

H. Bialkowsky (*Paper Trade J.*, Sept. 8, 1933) studied the nature of dilute sodium abietate solutions and the action of various commercial pulps on them. He found that at beater concentration the hydrolysis of the size was only a few per cent, so the major portion can still exist as sodium resinate. The stability of the size in the beater water is determined largely by its alkalinity. Commercial fibers have a great tendency to lower the alkalinity of dilute caustic soda solutions; unbleached pulps are the most active, then bleached wood pulps, while rag and purified wood pulps show the least tendency.

H. Ellern-Eichmann (*Papier-Fabr.* Tech.-wiss. Teil 197, 209, 226, 1933) says that in unbeaten pulps the natural adhesion of the fibers is slight and the addition of rosin aids it; if adhesion is large, as in strongly beaten pulps, rosin decreases strength by interfering with fiber bonding.

K. Kanamaru and T. Tsuchida (*Jour. Soc. Chem. Ind.*—Japan, March, 1933) studied the effect of acids, alkalies and salts on the charges of hydrosols of abietic acid and its sodium soap, and on the turbidity of these sols. They concluded that alum lowers interfacial potential of both fibers and rosin particles to a low value—called the critical potential—and weakens their mutually repulsive force. Because of its greater efficiency in this reduction, alum is the best sizing agent.

In studying the methods of testing sizing materials on a laboratory scale, V. R. Croswell, A. C. Dreshfield and H. F. Heller (*The Paper Maker*, 2 No. 1, Jan-Feb., 1933) found that retention of rosin dropped with decrease in stock concentration when sheets were made. The sharpest break in the curve took place below 0.5 per cent fiber consistency. They also found that dilute stock (0.5 to 0.1 per cent density) retained less rosin as time of standing lengthened.

B. von Possanner (*Papier-Fabr.*, Aug. 4, 1935) studied the sizing of hand made sheets with rosin size, montan wax and mixtures. The drying temperature and the *p*H at the time of adding the size are of great importance. With rosin, sizing increases with drying temperature up to an optimum, and then decreases. With montan wax increase in drying temperature decreases sizing. The best *p*H for rosin sizing is 4.5-5.0, and for montan wax 7.5-7.7; for mixtures the reaction should be slightly basic.

S. J. Robinson (*Paper Trade J.*, Aug. 13, 1936) reports on a study of the system size-alum-fiber. The paper contains nine tables and graphs.

S. Samuelsen (*Papir J.*, 25 91-102, 1937) describes the methods and apparatus used at the Research Institute of the Norwegian Paper Industry for determining the influence of temperature of drying, size quantity, alum concentration and water used. Sizing was found to increase with increasing temperature up to 115 deg. and then decrease with higher temperatures. It increases rapidly as the size rises from 0.5 to 2.0 per cent of the weight of paper, and then at a slower rate up to 4 per cent. Sizing responds to the amount of alum in a similar manner to that of size.

R. Carter and V. G. W. Harrison (*World's Paper Trade Rev. 118* T. S. 1942) report on a three-day run of kraft paper in which soap was used on the second day, and rosin on the other two. More soap than rosin had to be used for the same degree of sizing. The effect of variables was not studied.

W. Brecht and E. Liebert (*Papier-Fabr. 41*, 9-16, 18-27, 1943) tested the sizing of 32 mill made papers by means of a modified Hammond tester. They found that the effectiveness of sizing depended on *p*H (optimum 4.5-5.0), temperature (best at 40 C.), degree of beating and order of addition of size, alum and filler. The stock density had little influence. Wet pressing was important and best results were obtained when the sheet retained 50 per cent of water. The best sizing of hand sheets was found when they retained 4 per cent of water and were

tested at 40 per cent relative humidity.

S. Samuelsen and G. Ellefsen (*Papir J. 31* 23-26, 1943) discuss the dependence of size resistance on the temperature and moisture relationship of paper during drying. The higher the per cent of dry substance in the paper before drying the lower is the resistance. Drying temperatures should be about 110-120 C. The paper should not reach sintering temperature until the dry content reaches a minimum of 50-55 per cent and a maximum of 60-65 per cent for Delthirna, or about 5 per cent less for Bewoid size, when the temperature of the paper reaches 80 C.

W. S. Wilson and H. E. Duston (*Paper Trade J.*, Nov. 18, 1943) in a discussion of the reactions of fibers and rosin, give curves comparing the ink penetration and the Cobb test. Sizing rises to a maximum and then drops as the rosin used increases; 4 per cent is about the best. For any given amount of rosin an increase in alum also increases sizing. With a constant amount of alum large particle size gives a higher maximum sizing test than fine particle size, but more rosin is necessary. With lower percentages of rosin fine particles are better. A very similar paper by the same authors appeared in *Paper Mill News*, Dec. 18, 1943.

Theoretical Considerations

This small group of papers contains no radically new theories regarding sizing, and a considerable number are devoted to discussions of theories which have been proposed previously. Others deal with certain limited factors, while several are attempts to develop theories to explain observed facts.

J. Strachan (*Paper Maker and British Paper Trade J.*, Sept.-Nov., 1931) reviews the theories of rosin sizing and the troubles encountered in practice. He proposes a theory, which he claims explains these difficulties fully. This comprises the formation of rosin and alumina by precipitation. In the fibers a semipermeable membrane of alumina is formed, and this prevents the rosin from diffusing into the cellulose. The positively charged alumina is adsorbed on the negative fiber surface and in turn adsorbs the negatively charged rosin. The presence of Ca ions in water is important, and when 1 mol of CaO is present to every mol of Al_2O_3 there is a much stronger adsorption of the rosin-alumina complex.

R. Lorenz (*Papier-Fabr.* Dec. 11, 1932) discusses various sizing theories, such as the resinate, free rosin, colloid chemical, etc., and takes up the influence of bicarbonate hardness of water, carbon dioxide content, *p*H and buffer action. It is stated that sizing may be destroyed by bacteria.

F. Arledter (*Papier-Fabr.* Nov. 6, 1932) believes that the size of the rosin particles should be neither too large nor too small; the proper size must be determined by conditions at the different mills. This also holds for the free rosin content of the size. He considers that sizing is a combination of floc formation from the sodium abietate and electrical precipitation of free rosin particles.

F. Schutz and W. Klauditz (*Papier-Fabr.* May 7-21, 1933) do not accept the free rosin theory of sizing and consider most of the present theories of rosin sizing untenable. They claim that sodium resinate is quantitatively changed to aluminum resinate under conditions of actual sizing, and that the colloidal particles in free rosin size are not free rosin, but an acid salt of resinic acid. Extractions proved that aluminum resinate is contained in sized paper, and that its quantity is equivalent to the quantity of bound rosin added to the beater for sizing.

An anonymous writer (*G. M. Papeterie*, March 19-25, April 10, 1933) presents data regarding the retention of different types of size and the physico-chemical changes during sizing. He gives figures for the melting point of sizes precipitated in the absence of fibers and dried under different conditions. The conclusion reached is that the superiority of sizing with a 90-95 per cent free rosin size over that with rosin soap is due, at least in part, to the fact that free rosin on the fibers actually melts or sinters on the driers, while aluminum resinate does not.

Y. G. Khinchin (*Bum. Prom. 21*, No. 11, 12, 1933) gives a comprehensive review of the theories expressed by Schutz and Klauditz, and by Strachan in the above papers.

B. Wieger (*Tech. Assoc. Papers 18* 447, 1935) in connection with a description of the Bewoid sizing process, discusses the various theories of sizing, such as the membrane theory; attractive forces between fibers and rosin; the Bewoid theory; paper capillaries; the rosin sintering theory, etc. In an earlier paper (*Zellstoff Papier 12* No. 1, 15-18, 1932) the same author expresses the belief that Bewoid size does not coat the fibers with a water repellent film. He claims that photomicrographs show disconnected balls of rosin precipitated on the fibers.

In another paper B. Wieger (*Kunstdinger u Leim, 32* 81-85, 111-114, 1935) rejects the semipermeable membrane theory, and favors the theory that aluminum hydrate adheres to the fiber surface and acts as a mordant to bind the rosin particles, provided they contain alkali resinate molecules on their surfaces. Drying too rapidly is supposed to injure sizing by loosening the size particles from the fibers by sudden vaporization of water.

R. M. K. Cobb (*Paper Trade J.*, April 18, 1935) theorizes about sizing from the standpoint of the contact angle and the laws governing penetration and swelling by fluids; the physical state and position of sizing materials in the paper; the reason for internal and surface sizing; the basis of water, grease, moisture and ink resistance, etc.

From a critical review of sizing processes, Y. G. Khinchin (*Bum. Prom. 15*, No. 9 15-23, 1937) concludes that cellulose is not amphoteric and that its apparently amphoteric properties are due to impurities and substances adsorbed during processing.

G. E. Shnyparkov (*Bum. Prom. 15*, No. 9 24-32, 1937) considers that sizing in the pulp is effected by a stable adsorption combination of aluminum hydrate on the surface of cellulose by means of residual valencies, and by a chemical reaction of the alumina with resinate extending over the surface of rosin globules. In paper sizing the formation of the adsorption compound is accompanied by secondary reactions with formation of undesirable aluminum resinates. These do not react with cellulose by residual valence, but are retained chiefly as fillers.

B. W. Rowland and W. M. Bain (*Paper Trade J.*, April 25, 1940) discuss rosin sizing and the theories developed to account for known facts concerning it. No new data are presented.

I. I. Kovaleskii (*Paper Trade J.*, Feb. 3, 1938) gives a general discussion of the influence of beating, pensosans and drying conditions on sizing.

H. J. Hotz, T. T. Collins, Jr., and H. L. Davis (*Paper Trade J.*, Feb. 20, 1941) offer a theoretical discussion of the benefits of Prosize over completely saponified rosin, or a 30 per cent free rosin size. This is based on precipitates obtained in the absence of fibers.

Alkaline Fillers

During this period there have been relatively few articles relating to the sizing of papers containing alkaline fillers, such as calcium carbonate. There is still no really satisfactory way to obtain hard sized paper by beater sizing methods, and frothing on the wire and in the beater is a very real problem. Good results can be obtained by surface sizing methods.

According to E. Sutermeister and J. A. Warren (U. S. pat. 1838969, Dec. 29, 1931) sized paper is made by using an alkaline filler in association with

a paraffin emulsion and rosin size. In another patent (U. S. 1839449, Jan. 5, 1932) the alkaline earth metal carbonate filler is coated with the reaction product formed by treating the carbonate with an emulsion of a fatty acid compound, and rosin is employed as the sizing material. The first of these patents is very similar to that of the Raffold International Corp. (Brit. Pat. 333620, May 17, 1929) and the second closely resembles that to O. Kress and C. E. Johnson (U. S. pat. 2059464, Nov. 3, 1936) except that they use a paraffin preparation instead of a fatty acid compound.

Paper containing an alkaline filler is sized, according to H. R. Rafton (U. S. pat. 1819441, Aug. 18, 1931) by means of a stable emulsion of paraffin, with or without starch or alum, but without rosin. In another patent (U. S. 2045052, June 23, 1936) Rafton claims the sizing of a fibrous web containing an alkaline filler by treating it with a water-insoluble sizing agent, such as rosin dissolved in a solvent, after which the liquid content of the web is practically completely dried without fluxing the size.

Kress and Johnson (U. S. pat. 2059465, Nov. 3, 1936) also propose sizing with a wax or paraffin emulsion stabilized by protein and containing an emulsifying agent, such as ammonium oleate. This may be applied during the formation of the web, after formation, but while it is still wet, or after the paper is dried.

In the process devised by F. G. Rawling (U. S. pat. 2114809, April 19, 1938) paper stock at a *p*H not above 7.0 is mixed in a closed vessel with a filler containing calcium carbonate, and sizing ingredients, including alum. Escape of carbon dioxide is prevented in order to keep the *p*H at not over 7.0.

For sizing carbonate filled paper J. C. Schmidt (U. S. pat. 2109931, March 1, 1938) employs an emulsion, dispersion or solution of a water resistant sizing material incorporated in the pulp and precipitated with an acidic substance. The acidity is neutralized by addition of an alkali which does not liberate carbon dioxide, and calcium carbonate which has been treated with a water resistant substance insensitive to the alkalinity of calcium carbonate is then added.

L. L. Larson (U. S. pat. 2109944, March 1, 1938) sizes calcium carbonate by adding to a slurry of it, a size prepared by dissolving oil plasticized rosin in a volatile organic solvent, emulsifying with water and an emulsifying agent and then passing the emulsion through a homogenizer until the resin is in a colloidal state.

Silicate Sizing

Silicate finds a useful place in papermaking, but it should not be termed a sizing agent in the same sense as rosin. Its chief function is to harden the paper and reduce fuzz, but its water repellent properties in paper are extremely slight, if any. If used in conjunction with rosin size it may have some beneficial effects.

An anonymous writer (*Zellstoff Papier*, April, 1931) claims that water glass as an aid in sizing helps reduce dust in slitting, makes the paper flat and reduces the time required for beating.

A. C. Neilson Co. and H. H. Latimer (*Paper Mill*, Aug. 15, 1931) report on the use of silicate in cover paper and claim that it shortens the time of beating by 30 minutes, improves hardness, finish, snap, texture, appearance and ink resistance of the paper. The tear test was also said to be increased.

L. Kantor (*Bum. Prom. 10* No. 3, 15-17, 1931) recommends sizing pulp with 1.2 per cent sodium silicate, 0.5 per cent caustic soda and 3.2 per cent alum, all based on the fiber. This is claimed to be cheaper and better than rosin sizing.

F. Freeth (*Paper Maker 93* T. S. 63-64, 69-70, 1937) gives an outline of the manufacture of sodium silicate and discusses its use in paper sizing.

An anonymous writer (*Wochbl. Papierfabr. 68* No. 15, 286, No. 18 343, 1937) states that water glass is generally used in addition to rosin size when a hard and water resistant paper with a good rattle is desired. The best retention is obtained when the order of addition to the beater is alum, rosin size, and silicate. Silicate is also frequently used in combination with starch in amounts varying from 1 to 5 per cent.

M. Chene and M. Aribert (*Papier 44* 275-280, 1941) claim that neither silicate nor aluminate is satisfactory as a paper size alone, but that when used together the results are better. Best of all is to add about 0.2-0.7 per cent of rosin size with the other materials.

Starch Sizing

This review of starch sizing methods makes no claim to completeness and it is doubtful if it should be included in this paper. Starch, either cooked or raw, when used in the beater or in the stock as it goes to the wire, adds practically nothing to the water resistance of the paper. Its function is purely one of strengthening the paper, especially with regard to the burst and fold factors.

In a study of starch sizing with a modified corn starch W. A. Chilson, F. A. Simmonds, P. K. Baird and C. E. Curran (*Paper Trade J.*, Oct. 5, 1933) found that the bursting, tearing and tensile strength of kraft paper were increased when the starch was added to the stuff entering the chest, if the *p*H of the stock at the head box was 4.4-5.5. At a *p*H of 6.5 only burst increased. Temperature variations between 65 and 75 Fahr. did not affect water resistance.

B. W. Rowland (*Paper Trade J.*, Nov. 23, 1931) claims that cooked starch can be effectively precipitated on pulp fibers in the beater by adding successively cooked starch and alum, and then slowly neutralizing with an alkali such as ammonia. Reversing the order of addition of alkali and alum is also satisfactory. Passing from neutrality to slightly alkaline and back again to acid does no harm. Both alkali and alum are used in much greater amounts than for usual rosin sizing. The ratio of alum to starch should be held within certain limits, and alumina beyond precipitation requirements lowers the adhesion strength of the mass. The bursting strength of paper made in this way is higher than with the same amount of starch used in the customary manner. The greatest drawback to the process seems to be that any severe mechanical agitation after the precipitation of the starch tends to dislodge it from the fibers again.

C. G. Weber, M. B. Shaw and M. J. O'Leary (U. S. Bureau of Std's, Miscl. Pub. M 150, June, 1935) studied starch beater sizing and the relation of maize, cassava and sweet potato starches on starch and clay retention and the properties of different types of paper. All the starches improved the bursting strength, and maize and cassava improved clay retention. Papers with all these kinds were equally stable by the accelerated aging test.

According to Penick & Ford, Ltd. (Brit. pat. 485700, March 9, 1937) starch is heated in water to the point of maximum swelling without disruption of the granules. The swelling is controlled by addition of an inhibiting agent, such as soap, sulphonated vegetable oil, etc. The final gelatinization during drying may be aided by alum to render the inhibiting agent insoluble.

In preparing starch for sizing paper, O. F. Neitzke (U. S. pat. 2072179, March 2, 1937) treats it, prior to incorporating in the stock, with an alkaline solution to induce an initial swelling and then neutralizes by acid reagents.

B. W. Rowland and J. V. Bauer (U. S. pat. 2113034, April 5, 1938) introduces into the furnish, before

completing the beating, an alkaline dispersion of a tough starch, produced by treating raw starch with formaldehyde and an acid catalyst, such as hydrochloric acid. Prior to the papermaking operation sufficient acidic material is added to precipitate the starch on the fiber in finely divided form.

E. M. Wixted and L. G. Bassett (*Paper Trade J.*, Feb. 17, 1938) discuss the preparation of corn and tapioca starches for tub sizing by means of four commercial enzymes. They compare viscosity, reducing sugars and adhesive strength with an oxidized starch.

According to D. K. Pattiloch (U. S. pat. 2147213, Feb. 14, 1939) gelatinized starch is mixed with paper fibers, diluted to paper making consistency and alum is added while the stock is flowing in a stream. This is followed by addition of sufficient sodium aluminate, metasilicate or sesquisilicate to form an aluminum precipitate by substantially complete reaction of both ingredients, but keeping the furnish acid. Starch is precipitated on the fibers, which are then formed into paper.

Surface Sizing

This is another section whose inclusion is of doubtful value, partly because the subject is not thoroughly covered, and partly because surface sizing is so very different from that of beater sizing.

R. Silberberger (Aust. pat. 147807) sizes paper by passing it through a bath containing animal glue plus a hardening agent which gives off formaldehyde. Such an agent may be prepared from urea or thiourea and formaldehyde or trioxymethylene, mixed in the cold to give an additive compound.

According to P. W. Codwise (U. S. pat. 1937317, Nov. 28, 1933) a size of low penetrating power is applied to the surface of the paper after the sheet has been dried and subjected to a pressure sufficient to so compact the sheet that the sizing applied is for the most part a surface coating.

An adhesive for use in coatings or as a surface size is prepared by H. V. Dunham (U. S. pat. 1965693, July 10, 1934) by grinding a meal of legume seed (preferably soy bean) to pass an 80-mesh screen and heating with water and 6 per cent of caustic soda on the weight of the meal. The suspension is finally passed through any suitable colloid mill.

A. Thiriet and J. Meyer (Brit. pat. 406771, March 8, 1934) size or waterproof paper or cardboard by applying fused paraffin, or a compound containing it, at or just before the last drying cylinder of the paper machine. It is deposited by transfer, brushing or spraying.

G. A. Richter (U. S. pat. 1969856, Aug. 14, 1934) reduces or nullifies the injurious effect of surface sizing on tear resistance by mixing highly gelatinized cellulose pulp with the glue size bath.

In another process for sizing, Richter (U. S. pat. 2018875, Oct. 29, 1935) passes the waterleaf sheet through a 1-5 per cent viscose solution, and regenerates the cellulose from the viscose either by drying at high temperature or by treating with an acid or an acid salt. The final treatment is with a 6-8 per cent glue solution, with or without alum or other glue tanning agent.

Henkel & Cie. G.m.b.H. (Fr. pat. 815383. July 10, 1937) use as sizing agents solution of cellulose ethers—methyl, ethyl and hydroxyethyl in a maximum concentration of 5 per cent.

C. J. Wernlund (U. S. pat. 2073666, March 16, 1937) sizes by coating a web of fibrous material with a protein solution, aluminum hydrate or other relatively insoluble inorganic material forming with an acid a protein hardening agent, a volatile alkali, as ammonia, in amount sufficient to prevent solution of the inorganic compound, and a compound such as ammonium formate or formamide, capable of hydrolyzing to form an acid. The paper so coated is finally dried.

J. J. L. Luti (*Chem. Weekblad* 35 211-218, 1938) studied papers finished with rosin or rosin and animal glue, and applied various physical strength tests at different humidities. No relation was found which would justify calculation of strength at one humidity from that made at another. Animal glue appeared to have little or no influence on the moisture content of the paper, but distinctly lowered its rate of absorption.

R. T. Nazzaro (*Paper Trade J.*, Nov. 5, 1942) discusses the use of synthetic resin emulsions for paper saturation and sizing. This does not include data on water resistance.

W. G. Hendrick (*Tech. Assoc. Papers* 26 457, 1943) presents a tabulation showing the factors influencing tub sizing, and the difficulties which they cause in operation.

This concludes Mr. Sutermeister's article. Part I appeared in January, Part II, in the February issue of this magazine.

Mill Maintenance Cost Control

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▶▶▶MAINTENANCE COST control must, by its very nature, be complete and in detail. However, it does not follow that it need be involved and laborious.

Maintenance, in its true sense, is merely the upkeep of existing physical properties, process machinery and the building structures which house it. Unfortunately, plant maintenance, as a plant continues to produce, becomes abnormal and but a small part of the work of the maintenance crews is truly normal maintenance. Accordingly, control analysis becomes difficult; non-recurring, on an annual basis, repair becomes necessary; an expanded program of plant safety and fire protection is conceived; alterations to the plant and its processes are undertaken; and sundry similar-in-nature functions are required of the maintenance department.

To fulfill control requirements, the plant and process must be carefully analyzed and departmental separations made as respect to each operational function in the process. Departmental services rendered on an over-all process basis must be set up. A clear understanding and agreement on departmental separation and service separation is most necessary if any control is to succeed.

As a rule, understanding and agreement on departmentalizing the process is not often difficult. However, seldom is the analyzation of departmental maintenance services understood or agreed upon. The reasons for difficulty with the departmental analyzation are: it must be done on a daily basis; it must be done by someone intimate with the work being undertaken for the control results desired; and, it must be honest.

It is evident that controls must be established for each department to analyze departmental maintenance and building repair in their various ramifications. In addition, they are necessary to supply information resulting from the extraordinary services of the maintenance department to the other departments.

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Recovery of Heat and Chemicals in Sulphate Recovery Furnace Stack Gases—Part II

T. T. COLLINS, JR.*
and
RUTH H. COLLINS

A REVIEW OF THE LITERATURE

▶▶▶ THE LITERATURE has recorded the possibilities of applying some of the common dry methods of dust collection in the case of recovery furnace stack gases, but apparently none of these methods have been used successfully in connection with this problem. Murdock (*7*) has mentioned that one mill had very little success with dust settling chambers for sulphate fume. Anderson (*8*) mentioned that filtration of the gases is complicated by clogging of the filtering medium.

Sultzer and Beaver (*10*) stated that filters are unsuccessful because the filter medium chars at high temperatures and plugs if the gases are condensed in the filter. Murdock (*7*) concluded that the use of filter bags made of glass cloth through which the stack gases could be passed above their dew point warranted further study because of the potentialities of the process. Mechanically operated bag filters have also been suggested by Wagner. (*35*, *37*).

The use of dry cyclones for the removal of fume has not been widely studied and none of the cyclones offered commercially at the present time appear to have a very high efficiency of chemical recovery on fume particles as small as those from a sulphate recovery furnace. Day (*31*) stated that the low specific gravity of the fume makes it difficult to recover in cyclones. Textor (*44*) mentioned that cyclones will remove about 30 per cent of the salt cake from the stack gases but their ineffectiveness was pointed out by Sultzer and Beaver (*10*) and Wagner (*37*). As a collector for fly ash from a recovery furnace, Stone and Trostel (*56*) have patented an arrangement in which dust is collected in hoppers after the boiler and returned to the system by flushing the hoppers with water. It is of interest to note that Vishnevsky (*109*) has recommended the use of Multiclones for removing salt cake fume from stack gases. It should be pointed out, however, that in recommending such equipment the erroneous assumption was made that the fume particle size is that of the agglomerates which were found in the dust sampled.

Of the several methods which have been investigated for the recovery of a portion of the heat and chemicals in the sulphate recovery furnace stack gases, wet scrubbing has by far been the most widely used procedure. Strangely enough, there were no thorough studies on the application of scrubbing in the soda and sulphate process until very recently and that probably accounts for the fact that no highly efficient scrubbers are operating on sulphate fume in the United States at present. Anderson (*8*) has stated that ordinary scrubbers have an efficiency of 25 per cent and some others are still higher. Day (*31*) said wet scrubbers are of little value on sulphate fume because even when the gases are cooled below their dew point the particles resist wetting. Textor (*44*) stated that wet scrubbers gave disappointing results as wet surfaces or large spray droplets removed only the largest particles of soda. It was recognized, however, that the scrubber efficiency could be increased by using a finer spray of scrubbing liquid. Sultzer and Beaver (*10*) found that scrubbers fail to remove 35 to 45 pounds of Na_2O per ton of pulp and that this can be removed only by a Cottrell precipitator. In addition, certain problems arise when using scrubbers. Anderson (*33*) has pointed out the effects of sodium sulphite in kraft pulping liquors and to avoid its introduction into the liquor for cooking, scrubbing liquor which contains it must be put into the black liquor going to the furnace.

The most widely used and one of the earliest types of scrubbers used in sulphate mills has been the conventional disc evaporator or some modification of it. According to Enderlein (*57-A*), this equipment was invented in 1887. For the most part these are used for thickening black liquor immediately before it is fed to the furnace, and the liquor carried up by the discs forms a considerable surface of liquor for evaporation of moisture and the absorption of gases and the collection of some fume and fly ash from the furnace. Sundblad (*57*) used a disc scrubber with water as the scrubbing liquid and this water was used for washing lime sludge and green liquor make-up. One author (*58*) has described a disc arrangement designed with baffles which ladle up the liquor and cascade it into the gas stream as the discs rotate. Other disc evaporators have been patented by Carlson (*59-A*) and Carlson (*59*). One of the most recent developments of disc evaporators has been that made by Nyquist (*60, 20*). The liquor is evaporated to dryness on discs and the solid material is scraped off and fed to the furnace dry. This arrangement has been said to substitute for a rotary burner and when used in conjunction with a liquor concentrator for scrubbing the stack gases has been said to reduce the salt cake loss out the stack to the low figure of about 4 kg. per metric ton of pulp. Peebles (*61*) has pointed out that the use of disc evaporators in conjunction with a recovery furnace results in the production of a considerable amount of odor and chemical fume. Hägglund and Hedlund (*45*) attributed a high loss of hydrogen sulphide from the furnace to the reaction of sulphur dioxide with black liquor in the disc evaporators. Klason (*24*) pointed out that destructive distillation of the black liquor occurs at this step in evaporation.

A number of miscellaneous scrubbers have been mentioned in connection with various black liquor furnaces which have been patented in the past. Blackman (*62*) described a baffle-type cascade scrubber in combination with pans holding liquor so as to present a large liquid surface for absorption and to accelerate evaporation. Cloudman (*63*) and Hambly (*64*) suggested spray scrubbers for recovering soda fume. Atwood (*65*) bubbled the stack gases through water to remove the fume. Moore (*66*) mentioned the use of a washer and used the scrubbing liquid in the dissolving tanks. Nielson (*67*), in reducing the odor of the furnace gases, passed them through a bed of black ash through which was trickled water or soda solution. The gases were then passed through scrubbers where they were washed by a counter-current flow of water which was used for green liquor make-up or washing pulp. Finally the gases were treated with waste lime

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sludge to absorb the odors and the sludge was returned to the causticizing tank so that when heated during the causticizing the odors were driven off and could be burned in the recovery furnace. Schwalbe (*23*) said Nielson's process was too difficult to operate. Serpas (*68*) utilized a scrubber composed of trays with perforations covered with bubble caps for evaporation of black liquor. Vishnevsky (*109*) has described a bubble cap tower used for scrubbing stack gases from a Russian installation which was said to recover only 21 per cent of the dust in the furnace gases.

Paschke (*4*) has reviewed several early German patents relating to scrubbers used for evaporating waste sulphate, sulphite and soda liquors. Of these, Mürbe (*69*) sprayed the liquor into a chamber through which the gas was passed and Achenbach (*70*) patented a trickling tower in which soda mill liquor was thickened by evaporation with furnace gases.

In connection with descriptions of early installations of Wagner recovery furnaces, a scrubber for heat and chemical recovery has been mentioned by Coombs (*71*), Anable (*72*), Wagner (*35, 36, 37, 73,* and *38*), and Webster and Wagner (*39*). According to Wagner (*36, 38*), the stack gases were passed into a scrubber tangentially as water was sprayed into it and then through a coke bed. When concentrated, the solution was pumped to the black liquor system. Wagner (*37, 35, 73,* and *39*) described installations consisting of "gyro" or "Feld" scrubbers in which various liquors were sprayed onto baffles in order to wash the gases. The theory for successful operation of these scrubbers in this particular instance was that the water droplets were said to have a positive electrical charge which neutralizes the negative charge on the fume particles and thus allows them to be wetted. White or green liquor was used as the scrubbing liquid to neutralize any sulphur dioxide in the gases although it was pointed out that when scrubbing with water alone, the fume solution remained alkaline for both soda and sulphate stack gases.

A novel method of reclaiming heat and chemicals from recovery furnace fume has been patented by Richter and Van Arsdel (*55*). The gases were passed into ceramic-filled towers and the low temperature of the filling caused a partial condensation of the water vapor with entrainment of the dust and absorption of the sulphur dioxide in the alkaline condensate. The condensate and chemicals were mixed with black liquor and sent to the furnace. In order to regain the heat in the stack gases and to prepare cooled condensation towers, alternate use was made of them as preheaters for the air used in the furnace. When a filling became heated to the point where it no longer caused condensation, the gases were then passed to a cold tower and the hot tower was cooled by blowing air through it and using the heated air for the furnace.

Kleinschmidt and Anthony (*34*) have described an experimental application of the Pease-Anthony cyclonic spray tower for the recovery of sulphate furnace fume with an efficiency of 65 per cent.

Spohn (*74*) has shown a baffle-type scrubber after a kraft recovery furnace and noted that it should collect sulphur as well as sodium salts. The sulphur sludge was returned to the furnace with the black liquor while the solution was used for green liquor make-up or washing pulp.

The spray tower scrubbers used on Babcock and Wilcox recovery units have been described by Tomlinson and Wilcoxson (*75*), Wilcoxson and Ely (*48*) and others (*49*). Baggs (*76*) claimed the B and W spray tower reclaimed 70 pounds of salt cake per ton of pulp but Wilcoxson and Ely (*48*) estimated only about 1/3 or less of the dust was removed in the unit. Scrubbers for recovery of salt cake and sulphur dioxide have been suggested in a report (*52*).

In some cases it has been necessary to humidify the stack gases before they enter a Cottrell precipitator and Millidge, Taylor, and Heimrod (*54*) have described a scrubber used for this purpose as consisting of a tank with a perforated top on which a layer of water was maintained so that the drops formed by water running through the holes would fall through the stream of gas and saturate it. It was said that less than 10 per cent of the sodium carbonate in the gas appeared in the scrubber water. The fume was then removed from the gas by means of an electrostatic precipitator. For the B and W furnace described by Whitney and Vivian (*5*), a spray tower was used to humidify the gases entering the precipitator and the spray was said to remove 40 per cent of the dust entering the scrubber. Other scrubbers were said to have efficiencies of 5 to 6 per cent and 12 per cent.

Edling (*40*) has observed a wood-filled gas washing tower used after a Tomlinson furnace. The patent of Badenhausen (*77*) disclosed a tower filled with Raschig rings over which weak black liquor was sprayed to absorb the salt cake fume. The liquor was recirculated until it contained 40 to 60 per cent solids. Brauns (*51*) said that after a disc evaporator installation in a Swedish mill the gases were passed through a heat exchanger and a gas washer to recover the heat and ash particles.

There recently have been some attempts to adapt economizers for heat and chemical recovery from sulphate stack gases. Seegers (*78*) described a liquor prewarming arrangement in which the hot gases passed over a bank of fin-covered tubes through which the liquor was pumped. Recirculated scrubbing liquid was sprayed over the outside of the tubes to keep the salt cake washed off. A rotary economizer for heating water has been mentioned by Liander (*30*). An alkaline washing solution was sprayed on the outside of the tubes so that gas was cooled to the dew point at least and this resulted in absorption of the sulphur dioxide as well. This installation was said to be cheaper and preferable to an electrostatic precipitator. More recently, a description (*25*) of a rotating economizer built by the Svenska Fläktfabriken has been given. This unit was said to be similar to that used in boiler houses but in order to protect the copper pipes carrying the heating fins from corrosion by sulphide gases, they are clad with a thin iron pipe. At a gas temperature of 140 C., this unit was said to produce at least 60 C. water and in some instances the water attained a temperature of 100 C. The rotating economizer also acted as a draft fan and the salt cake deposit was continuously washed from the tubes with recirculated solution.

In an early patent, Moore (*79*) disclosed a process in which was dried a mixture of sawdust and black liquor with recovery furnace gases. In this manner a suitable fuel was prepared and it was said some chemical recovery resulted.

A method of utilizing the heat in the stack gases for drying chips for pulping was developed in Sweden by Nordström and was later modified as a procedure for scrubbing the gases. Taylor (*80*) has stated that the stack gases from a sulphate mill, when passed through a tower packed with wood chips, reduced the moisture content of the wood from 60 per cent to 30 per cent and also recovered some of the chemicals in the gases. Hägglund (*16*) and Schmid (*81*) have described installations of the Nordström process. Schmid (*81*) mentioned that the condensate from sulphate stack gases is strongly acid and this acidity was found to be equal to 4 grams of sulphuric acid per liter; proof that a large part of the sulphur compounds escape in the gas. If black liquor was sprayed on the wood chips, the sulphidity of the resultant cooking liquor was increased. Nordström (*82, 83*) has described his process and some installa-

tions of it. The passage of sulphate recovery furnace gases over wood chips was held to prepare them for subsequent pulping and to result in evaporation of moisture from the wood. In addition, some of the dust and fumes in the gases are absorbed on the chips. It has been reported by investigators of this process that it was found difficult to pulp uniformly the chips treated in the early Nordström drying towers as the chips were "case hardened" by the heat and the liquor would not penetrate them completely. Nordström (*83*) eventually discovered that spraying black liquor over the chips increased their absorptive capacity for sulphur dioxide in the stack gases. In the Wifstavarf mill, the first year's operation of a Nordström tower resulted in drying the chips from 51.2 per cent to 32.5 per cent moisture, a gain of 1,265 kg. of steam per metric ton of pulp with a recovery of 31 kg. of salt cake per ton of pulp. The digester yield was increased 10 per cent. As the chips were acid when dried in the tower due to the absorption of sulphur compounds, they were then sprayed with black liquor to make them alkaline during the drying. This resulted in an increase of liquor sulphidity from 18 per cent to 23 per cent with a 7 per cent saving of the lime used for causticizing. The gases leaving the drying tower were 57 C. and were suggested for heating water. A considerable proportion of the odors in the gases were said to be absorbed on the chips.

Simultaneously with the development of the Nordström process, Schwalbe (*23*, *26*, and *84*) discovered that addition of a small amount of chlorine to the furnace gases caused a more complete oxidation of the sulphur dioxide and mercaptans when they were absorbed on wood chips. Other descriptions of Schwalbe's process have been given by Hägglund (*16*) and Nordström (*82*).

Segerfelt (*18*) patented a process for removing the odorous stack gas components by scrubbing them with solutions which absorbed and/or oxidized the sulphur compounds. Materials passed into the scrubber with the gases were air, steam, sulphur dioxide, chlorine, water, copper sulphate solution, sulphite waste liquor, sulphate black liquor, or solutions of hydrocarbons belonging to the terpene and camphor group. By cooling the gas below the dew point, the dust was collected on the moisture droplets. Schmid (*81*) has also described Segerfelt's process.

Müller (*85*) has devised a method of condensing the stack gases to free them of sulphur components and carbon dioxide. The noncondensible gases were then passed through black liquor or back into the furnace with fresh air. Schwalbe (*23*) discussed this process and said it was not successful as condensation did not deodorize the gas and the condensate required too much chemical for oxidation.

Landin (*86*) patented a process for removing the mercaptans from furnace gases by treatment with NO_2 or absorbing them on metal salts, but Müller (*87*) pointed out that this was similar to an earlier patent of Schwalbe (*88*).

The Knichalik process described by Knichalik (*89*), Hägglund (*16*), and Schmid (*81*) consisted of removing the furnace gas odors with black liquor or white liquor in a scrubbing tower located between the rotary furnace and the disc evaporators.

In the Goodell patents (*90*, *91*), the stack gases from the kraft recovery furnace are used for spray drying the black liquor in a scrubber before it is fed to the furnace. One patent (*91*) describes a scrubber for concentrating black liquor by utilizing the sensible heat in the gases leaving the spray dryer. The gases are saturated and pass through a heat exchanger to heat water or liquor. Rosenblad (*92*) has also discussed this procedure. Some recovery of chemicals from the furnace gases was expected to take place in the spray dryer.

Although Rosenblad (*92*) and others have pointed out that the Ramén system was designed for evaporating sulphite waste liquor with flue gases, its use has probably been considered for the sulphate mill as well. A description given in Ramén's patent (*93*) shows the furnace gases passing through a cascade scrubber countercurrently against cold water. The gases are cooled below their dew point and give up considerable sensible heat as well as latent heat of vaporization to the liquid. The heated scrubber liquid then passes through an indirect heat exchanger and gives up its heat to cold, diluted pulp mill liquors. The cooled scrubber liquor then circulates back through the cascade tower and the heated, waste pulping liquor goes to a "flash tank" where under vacuum a part of the water in it evaporates. Ramén (*20*) has also developed a system of drying kraft black liquor at the Östrands mill that resembles the Goodell process. The strong black liquor is sprayed into a stream of flue gas and dried with the dust being collected in a cyclone. It is said that the sublimation of the alkali is less if the liquor is predried before it is fed to the furnace.

One source (*94*) has given some historical data concerning a very interesting process, the INKA system, for recovering heat and chemicals from furnace gases. It is said that the basis for this evaporation method was worked out simultaneously in 1927-1928 by J. O. Nauclér and S. H. Ledin and also by E. Öman and E. Göth. The ideas of the two groups were then combined and further development was carried on under the auspices of the Industrikemiska Aktiebolaget of Stockholm, Sweden.

The INKA system of evaporation has been thoroughly described by a number of investigators and has been protected by several patents, many of which apparently do not apply to their system used in kraft pulp mills. Excellent descriptions of this system as applied in sulphate mills have been given by Elding (*17*), Göth (*95*), Boija (*47*), Schotte (*96*), Liander (*30*), Nauclér (*50*), Brauns (*51*), and others (*97*). Some of the patents covering the INKA system have been issued to Öman and Ledin (*98*), Öman and Göth (*99*), Öman (*100*, *101*), Nauclér and Ledin (*102*, *103*), Persson and Nauclér (*104*, *105*), and Nauclér (*106*).

In general, the purpose of the INKA system of evaporation of black liquor is to utilize the sensible heat of the recovery furnace stack gases as well as a portion of the latent heat of vaporization of the moisture in the gas over a small but important temperature range. In some cases, the INKA evaporator has been installed after disc evaporators and early installations were the one at Grycksbro in 1930 and another at Amotfors, both in Sweden.

The basic principle of this system is to utilize the heat given up by the condensation of some of the water vapor in the stack gases to warm liquor which in turn can be evaporated by blowing a permanent, unsaturated gas, such as air, through it. The basic installation consists of three units called the saturator, the heater, and the evaporator. The saturator is a tower with a perforated plate over which the black liquor flows and the stack gases in passing through the perforations evaporate sufficient moisture to saturate the gases and thus also concentrate the liquor. The saturated gas then enters the heater where by indirect heat exchange a large proportion of the water vapor is condensed and its latent heat of vaporization is given up to cold black liquor. The condensate from the heater has been suggested for use in washing lime sludge and consequently green liquor makeup since it contains valuable amounts of salt cake. The black liquor heated in the heater is then pumped to an evaporator which is the same design as the saturator. Air is blown through

the warm black liquor with the result that the air leaving the liquor has been increased in temperature and carries with it the increased amount of water vapor required to saturate it at the higher temperature. It has been suggested that if the warmed, saturated air leaving the evaporator has a high enough temperature, it can be used again for further evaporation of liquor in another effect consisting of a heater followed by an evaporator.

Schotte (*96*) has given the following information about the INKA installation at the Amotfors plant which was designed to concentrate sulphate liquor from 16 to 24 Be at a temperature of 70 C. using gases leaving the discs at 200 to 350 C. As the flue gases were acid due to sulphuric and organic acids, the liquor in the saturator showed a tendency to precipitate but this has been reduced by spraying the liquor into the waste furnace gases and continually rinsing the walls. In the heater, the liquor was heated to between 45 and 55 C. with the effluent gas having temperatures of 50 to 60 C. The condensate formed in the heater has a temperature of 65 to 75 C., a *p*H of 4 to 6, and contained considerable sodium sulphate. The evaporator had an evaporation capacity of 150 to 180 kg. of water per square meter of perforated surface per hour and some difficulties were encountered with foaming. The air entering the evaporator had a temperature of 0 to 10 C. and left saturated with water at a temperature of 40 to 50 C., which is the same as that of the effluent liquor. It was said that the soda loss from a furnace was reduced to one-sixth of its former value by installation of the INKA system. Nauclér (*50*) has reported recoveries of 70 per cent of the alkali content of the gas and part of the sulphur dioxide while Liander (*30*) has given the value of 90 per cent salt cake recovered. The latter stated that the INKA system would be less expensive than an electrostatic precipitator.

Öman and Göth (*99*) state that the INKA system utilized 75 per cent of the heat in the stack gases. Persson and Nauclér (*104*) have mentioned the theory that condensing moisture on the fume particles causes them to be larger and more easily removed by scrubbing. Öman (*100*) has also suggested the use of hot, moist air from the paper machine in the INKA evaporator system.

Brauns (*51*) and others (*97, 107*) have described a more recent INKA installation at Grycksbro Pappersbruk in which the gases from the sulphate and sulphite recovery furnaces are used to evaporate the sulphite liquor which is burned in a spray furnace with extra black ash from the rotary burner of the sulphate recovery furnace. The excess black ash results from the increase in efficiency of the system due to pre-evaporation in the INKA system. The heat in the gases above 70 C. is used to evaporate the sulphite liquor entering the saturator at 90 C. until it is 50 per cent solids. If the gases entering the saturator have a temperature of 250 C., then it is possible to evaporate 2 metric tons of water from sulphite liquor per metric ton of kraft pulp. The saturated furnace gases then pass to the heater or condenser and evaporator of the INKA system. The heater or condensation tower is an indirect heat exchanger in which the hot saturated gases give up their heat to the kraft black liquor before that liquor is finally evaporated in the discs. Condensation of water from the saturated gases takes place in the heater and this condensate is cooled in two liquid to liquid heat exchangers where it heats diffuser wash water and is then reintroduced into the gas side of the heater. It is said to be possible to get 10 cubic meters of clean water at 60 C. per metric ton of pulp for washing diffusers. The flue gases leave the heater or condensation tower at 50 C. after increasing the temperature of the condensate from 48 to 68 C. The excess condensate is used for washing lime sludge and 3½ metric tons of condensate are obtained per metric ton of kraft pulp. As this condensate takes up a considerable amount of the alkali in the gases, it is possible to save 30 to 40 kg. of Na_2SO_4 per metric ton of pulp. This is said to amount to 65 to 75 per cent of the alkali compounds and 75 to 85 per cent of the sulphur in the stack gases, depending on the *p*H of the condensate. The kraft liquor from the heater goes to the evaporator, where air is blown through it. This results in oxidation of some of the sulphur compounds in the black liquor as well as evaporation of approximately 2.6 metric tons of water per metric ton of sulphate pulp. Edling (*17*) described an INKA system pilot plant which removed 82.5 per cent of the salt cake from the stack gases.

The advantages of the INKA system have also been pointed out by Rosenblad (*92*) and others (*20*). It has been suggested for saturating gases before a "wet" electrostatic precipitator by Edling (*17*).

Of all the scrubbers suggested for sulphate recovery furnace fume, the most recently publicized is that developed by Tomlinson, Tomlinson, Schwartz, Orloff, and Robertson (*41*) and described by several others (*108*) as being a recent installation made by the Babcock and Wilcox Company at the new Canadian sulphate mill of the Marathon Corporation.

An integral part of this system is the black liquor oxidation tower, a coke-packed trickling tower in which air is blown through weak black liquor before it goes to the vacuum evaporators. The purpose of the liquor oxidation is to reduce the sulphur loss from the furnace when the liquor is incinerated or used as a scrubbing liquid on the stack gases. Black liquor sprayed into the gases from the recovery furnace as they enter a cyclonic tower saturate the gases and perform some concentration of the black liquor. The furnace gases leave the cyclonic evaporator above the saturation temperature of approximately 170 Fahr. and enter one of two specially designed types of scrubbers.

One type of scrubber used acts on the principle of a counter-current condensing tower. It is a grid-packed tower in which cooled, recirculated scrubbing liquid cools the furnace gases to 100-120 Fahr. and condenses out a large proportion of the moisture in the gas. The condensate and heated scrubbing liquid are then cooled and concentrated for the next cycle by passing them counter-current to cool air in another tower or by vacuum evaporation in a "flash" tank. The heat in the water vaporized in the flash tank can be used for heating water. The concentrated condensate contains a considerable portion of the chemicals in the flue gases.

An alternative method is the scrubbing of the gases in several "deluge" or cyclonic spray towers in series which do not condense the flue gas moisture. When the chemical scrubbing solution reaches sufficiently high concentration, it is mixed with the black liquor in the recovery system. It is said these cyclonic spray towers remove most of the sulphur containing gases and 90 to 98 per cent of the sodium sulphate fume. The hot, saturated gases leaving the cyclonic spray towers are used to heat fresh water for washing pulp in a counter-current tower. The gas leaves the tower at a temperature of 100 to 120 Fahr. and the hot water at 165 Fahr. approximately. It is said that this hot water amounts to 400 to 500 gpm. for a 100-ton pulp mill.

Tomlinson and his coworkers (*41*) have given considerable data on a pilot plant study as well as mill installations of these various scrubbing combinations. The publicity given their work points to a renewed interest in the possibilities of scrubbing sulphate and soda furnace stack gases for recovery of heat and chemicals.

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▼

Mill Maintenance Cost Control

(Continued from page 1765)

To control the maintenance of mill processes, three divisions of maintenance should be established: (1) *Routine,* (2) *Renewal,* and (3) *Alterations.* Routine maintenance should include only the labor and necessary materials to keep the mill processes functioning normally. Renewals and alterations maintenance are unusual, not regularly recurring. Therefore, they require special authorization from the control agent in order that proper separation from normal will result. Renewals maintenance should consist of unusual replacements of large parts or portions of any process machinery; alterations maintenance, of minor changes in processes or machines which do not materially affect the normally expected quality or quantity of the machine or process.

In the processing operations of a mill, there are a countless number of necessary repairs because of constant wear, such as on screen plates, wires, ropes, belts and so forth. Actually the repair or renewal of such items is not maintenance but rather production expense—a separate type of such expense. Accordingly, for this type of maintenance, a classification of *production* maintenance should be incorporated into the control.

The control of building repair need differentiate only between normal or routine and extraordinary. Normal building repair consists of work and material required to keep it in good repair; extraordinary, consists of the work and material required in extensive repairing or rebuilding, and requires special control for each specific job.

Improvement to processes or buildings is always by special executive approval. Accordingly, their control should be established in such a manner as will clearly separate the various and distinct phases of the undertaking on a labor and material basis.

Paper Standardization

as an Aid to the Printer—Part 3

M. S. KANTROWITZ[1] and E. W. SPENCER[2]

U. S. GPO Packaging Requirements

▶▶▶ THE PACKAGING AND delivery of paper for the consumption of the United States Government Printing Office and for that of the Departmental Service is specified by the GPO. In the Proposal for furnishing paper for the Public Printing and Binding and for use of the Government Departments and establishments in the District of Columbia, the specifications and general requirements are clearly stated to prospective bidders. These requirements are as follows:

Packaging

All paper, unless ordered in rolls or on skids or otherwise specified, must be packed in tight wooden cases. Wooden cases must be made from dry lumber not less than 13/16 inch thick: Provided, however, that the right is reserved to the Public Printer to order for delivery on skids any of the paper covered by the subjoined schedule which may be satisfactorily handled when packed in this manner. The contract price accordingly will be modified by the differential cost of packing in effect at the time of shipment. Where skids are specified in the subjoined schedule or called for under the preceding proviso, they must be substantially made to permit tiering without damage to stock. Runners are to be one piece 9½ inches high, 3 inches thick, and shall run the full length of the skid or be equal to this strength. On all paper with widths of 34 inches or less that is single tiered, the runners of the skids shall run the short way. Clearance between runners shall be not less than 28 inches. The over-all dimensions of loaded skids shall not exceed 46 inches in width, 64 inches in length, and 60 inches in height. The ends of rolls shall be well protected. All rolls, except newsprint and calendar tag board, must be shipped on their sides. The diameter or weight of the rolls will be specified in the order. This paragraph does not apply to binder's boards and chestnut cover boards.

Weight, Banding, and Marking

All flat paper must be carefully packed; if in wooden cases the weight should be approximately 600 pounds to the case; if on skids, the weight shall not exceed 3,500 pounds to the skid; if in bundles, the weight must not exceed 175 pounds per package. Where the specifications require that the paper be securely banded full width, the band must be the full length of the paper and go around the narrow way. All paper, unless otherwise provided, must be "slipped" with projecting colored paper marker between each 500 sheets. Direction of grain must be shown on the label in the space provided, whether or not grain is stated in the specifications. This paragraph does not apply to binder's boards and chestnut.

Wrapping

All paper packed in cases or on skids should be carefully wrapped. The outer wrapper must be water resistant. All rolls should be tightly wrapped and edges of wrappers and bands securely glued and folded as protection against damage in transit. Minimum requirements for roll wrapping are as follows:

One round of waterproof paper next to roll.
One round of inside body wrapper.
One round of outside body wrapper.
One inside and one outside band at each end of the roll.
Two inside heads and one outside head on each end of the roll.

Wrappers and bands shall extend 9 inches beyond each end of the roll.

Folds of wrappers and bands shall be crimped over ends of roll evenly.

Cores

Where the specifications call for 3-inch cores, all rolls are to be wound on 3-inch iron cores, or nonreturnable fiber cores which will not crush or deform in transit nor as a result of stacking the rolls 5 high, such cores to have metal plugs in the ends and to be furnished by the contractor. Where 6-inch cores are specified all rolls must be wound on iron or metal-capped returnable cores to be furnished by the Public Printer, f.o.b. Washington, D. C. Cores for the remaking of rejected paper where Government cores are held must be furnished by the contractor at his expense. If, however, it becomes necessary for the Public Printer, in his discretion, to furnish cores to a contractor who has retained cores in rolls of rejected paper, the cost of the extra cores will be deducted from the amount due such contractor, who shall pay all the expense incident to the cartage, freight, etc.

Labels and Memorandums

All skids, cases, bundles, or rolls must be distinctly marked with labels furnished by the Public Printer. Shipping memorandum blanks will be furnished to contractors and must be made out in detail for each shipment and mailed by the manufacturer direct to the Public Printer on the date of shipment. On shipments made to destinations other than Government Printing Office, Washington, D. C., the contractor's shipping memorandum must be made out in triplicate. The original copy shall be mailed direct to the Public Printer, and the duplicate and triplicate copies shall be mailed to the consignee on the date of shipment. Failure to comply with these instructions will result in protracted delay in payment and the imposition of any charges which might be incurred by the delay of the contractor in furnishing such shipping memorandum.

Carloading

The loading of cars must be by the following method or equal thereto. All paper on skids must be loaded in cars in two separate units, one in each end of the car. Sufficient doorway clearance must be provided to allow unloading by electric lift trucks. Each unit must be bound securely with 1¼ in. x .035 in. steel strapping having a tensile strength of 5,000 lb. Mechanical brakeman plates must be fixed to the floor of the car beneath each unit, through which the steel strapping is threaded. All pressure points

(1) Technical Director and (2) Assistant Technical Director, U. S. Government Printing Office, Washington, D. C. Published by permission of the Hon. A. E. Giegengack, Public Printer of the United States.

of the steel strapping on the skidload must be reinforced and protected with lumber. Where paper rolls are loaded in cars on their sides such loads must be divided into two or more units and may be single or double decked. Each unit must be bound with 1¼ in. x .035 in. steel strapping. Mechanical brakeman plates must be fixed to the floor, through which the straps are threaded to retard movement of the load.

Concerning skids, the United States Government Printing Office does not specify the kind of lumber or the precise construction to be employed. That would seem to belong in the realm of good carpentry rather than of chemistry! Certain measurements are specified to meet the mechanical requirements of trucks to handle the skids in delivering them to the Stores Division and pressroom. These required measurements pertain to the clearance between the floor and skid platform and the maximum height, length, and width of the skid to facilitate passage through doorways and tier stacking in storage.

Experience has proved that some skids received do not have a sufficient clearance to permit all electric lift and hand trucks to go freely beneath the skid platform. It, therefore, becomes necessary both in the storerooms and in the pressrooms to shimmy up the skids to a greater height by placing strips or chips of wood under the runners before lowering the skid to a resting place. This procedure is not only wasteful of time and labor but very messy and often dangerous.

Makeshift methods of building skids could be easily eliminated by standardizing the selection of wood and the construction of skids to standardized dimensions according to the sizes and weights of the papers packaged.

There appears to be no uniformity in the method of building skids. Many are adequately built from good lumber of proper thickness, but some are constructed of ½ inch boards nailed together for platforms and with runners of corresponding weak construction.

Skid runners are made, some of a single joist, some of from four to six parallel pieces of thin boards nailed together, and some are built of many thin pieces of wood placed horizontally one upon another like a stack of pancakes and offering but little more security for supporting the overlying load of a ton or more of paper. Often such poorly built runners break down of their own accord and permit the paper pile to lean or tip over, putting a permanent wave in the paper and a hazard in the way of the handlers. Runners are sometimes laid on the long dimension of the skid as they should be, and sometimes, apparently to economize lumber, they are laid across the shorter dimension. This latter design offers obstruction to tier staking. To obtain the specified clearance of 9½ inches from the floor, 8 inch joists are built up by added strips of several pieces of very thin wood. In some instances, legs are built upon the 4 corners and at the side of the platform centers as substitutes for complete runners. Such legs are sometimes laminated from thin boards nailed together, in such a way that they are easily broken apart when the skids are jostled by moving trucks or rearranged in the storage classification of stocks. When one of these weak stilts fail, the pile tips beyond control and has to be restacked by hand at considerable cost in waste sheets and labor.

The platform floors are too often built of lumber too thin or too weak to support the overlying load of paper without sagging.

The top board construction, corner protection and banding of skids also present a variety of forms, which might well be reduced to practical standards.

In these constructions all details are left to the liberal interpretation of those who package the paper and variations in shipments are therefore unavoidable.

Some working suggestions might here be proposed for improving the construction of skids.

1) They might be fabricated of more uniform waste lumber. Without additional cost better selection of materials for the purpose might be made.

2) Economy could be effected in construction by using lighter lumber than 2 in. x 4 in. timber in building the skid top. Unless these strips run the short way of the skid, the problem of stacking in tiers in the warehouse is complicated, because the runners of the top skid do not fit the top of the skid beneath. To make the upper skid stand level it is often necessary to place a home made wooden platform on top of the supporting paper skid.

3) Storage and handling would be greatly facilitated if the runners were, for heavy loads, made of solid 4 in. x 10 in. lumber, running the long dimension of the skid and offset about 4 to 6 inches from the edge of the bed platform. This construction would aid in carrying the heavy paper load without sagging in the middle of the platform. Such a pattern would also greatly assist stacking the skids with proper stability and safety in double tiers, one upon another. A separation of 28 inches between these runners would be sufficient for the introduction of lift trucks.

4) Platforms made of thin lumber double laid should be laid with the boards crossed at right angles to obtain greater strength for supporting the paper stock without sagging.

5) The manner of applying metal bands could be improved upon and standardized to obtain greater effectiveness in strengthening the load with the expenditure of less material and effort.

6) The protection of the four corners of the skid pile with lumber nailed to the top and bottom platforms is unnecessary and wasteful. A right angle bend made in a strip of fiberboard of the proper weight offers greater protection to the paper edges and is more effective in easily handling skids.

7) The building of discontinuous runners and runners of thin ½ inch boards either vertically or horizontally tied together with nails is wasteful and dangerous practice. Most of the injuries to paper in transit and sometimes in storage are attributable directly to this faulty construction of skid supports. When jostled by heavy electric trucks, such skids often lean from broken runners, or completely topple over and spill the paper causing considerable loss in material and labor costs.

8) Economy could be effected in shipping by standardizing the height and weight of certain papers stacked on skids. With more uniform loading of the skids more paper could be shipped in the same car with fewer skids. This is particularly true of 100 per cent rag stocks packed in cases which could be stacked considerably higher without danger of damage.

9) Small sizes of flat papers in double piles on the same skid should be placed on particularly rigid platforms to prevent spilling or damage to the edges of the sheets when the piles are separated or rocked together by the lifting force applied beneath the center of the skid.

Box Construction

The delivery of flat papers in wooden boxes or crates protects the paper stock, all the way from the mill to the press. For certain kinds of costly papers, it is still unsurpassed as a method of insuring perfect protection against rough handling during transportation.

Nailed wooden boxes, reinforced with cleats and battens and with metal straps or wires, have formed the common shipping case used in the Government service. Although other styles of cases such as the wire-bound wooden box, panel box, cleated plywood box, and corrugated and solid fiber container, developed in this country to meet new

conditions, have been and are being used in increasing numbers, the reinforced nailed wooden box is still one of the most important types of shipping container in the trade.

That all wooden cases do not give good service under the conditions to which they are subjected is a well known fact. The fault does not always lie in the case itself, however, but is frequently due to lack of knowledge of the essential details of specifications or of assembly and of adequate reinforcing. Each box must be built with regard to both the kind of handling it will be subjected to and the nature of the article it is to protect.

Of necessity packing boxes are usually made of low-grade lumber, so classified because of splits, shakes, knots, or other defects. Such defects as impair the efficiency of the box must be cut out; but those defects which do not destroy the proper balance of construction should be permitted in order to keep down the cost of manufacture.

One of the basic principles of wooden-box design is that it should be balanced in construction. This means that there should be enough strength in each part for the purpose intended and no more strength in any part than is necessary to balance the average strength in every part. All of the parts of such a box will resist equally the jolts and shocks of handling and transportation and will evenly distribute and absorb the impacts to which it is subjected.

In a balanced container there is no tendency of one part to fail before another part, since there is uniform strength throughout. The nailing, for example, will not give way before the top, bottom, sides and ends are affected, nor will these parts shear, buckle or break across the grain before the cleats give way.

A box may be balanced in construction but made too heavily or too lightly to function most economically. The box should be designed to just meet its purpose without excess weight, and possess maximum strength and durability for its intended use at a minimum cost.

The manner in which a wooden box is nailed is one of the most important features of its construction. In general, a box is only as strong as its nail-holding power and, in the case of most wooden packing boxes, failures are due more to improper nailing than to deficiencies in the wood.

In constructing a durable box, the nails used should be of the right kind and of the right size in relation to the thickness of the lumber. Furthermore, the correct number of nails should be used; they should be properly spaced, and they should be driven correctly with reference to the grain of the wood in each part of the box.

Cement-coated nails have a greater holding power than plain or uncoated nails or barbed nails. On the average, cement-coated nails develop from 10 to 30 per cent more resistance to pulling from the wood than do uncoated nails, whether smooth or barbed. For this reason, they have been recommended for all wooden packing cases.

Insect Infected Lumber

While on the subject of wooden box construction for paper shipments, an interesting sidelight may be thrown upon the selection of lumber.

On several occasions our laboratory was called upon by the Printing Division of another Government department to solve the mystery of small perforating holes occurring in sheets of their high grade map-printing papers delivered in sealed wooden cases.

Our investigation revealed that the boxes in which the paper was packed had been fabricated from lumber from which tree bark had not been entirely removed. We discovered that the holes in this paper were made by powder post beetles which the chief entomologists of the Department of Agriculture identified as the species Ernobius mollis.

These post-boring beetles cannot live in the wood itself. They require the bark to thrive on and, when their food is exhausted in one place, they tunnel their way through the wood and paper and make circular holes equalling in size the diameter of their bodies.

If the bark were thoroughly removed from all lumber used in box construction, this source of paper damage would be eliminated.

Carton Packaging

In March, 1929, the Government Printing Office tried an experiment in paper packaging by introducing a specification for delivery of many kinds of paper in cardboard cartons. This has been abandoned, except in instances of a few types of paper, not because the deliveries were unsatisfactory but because of the labor involved in opening and disposing of the many wrappings resulting from packaging in small units.

Packaging Requirements for Field Services

The Governmental Field Services are not required by law to purchase paper through the Government Printing Office. They do, however, follow closely the same specifications which are drawn up, in collaboration with the Government Printing Office, for Army and Navy Schedules and for the Federal Standard Stock Catalog of the Bureau of Federal Supply of the U. S. Treasury Department. These Federal Specifications very closely follow the Government Printing Office Standards for chemical and physical properties, but depart somewhat from the Schedule in the packaging and marking for the different papers. These are stated in each of the specifications.

Part III concludes this article. The first installment appeared in December, 1947; Part II was published in February, 1948.

Economic Forecast

"Present data do not indicate the 'Gloom Slingers' are right." Reuben B. Robertson, past president, American Paper and Pulp Association.

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"Quality will determine future sales; the public will no longer pay anything for anything." R. E. Canfield, Groundwood Manufacturers Association.

▼

"Paper mills are insuring themselves for the future by holding nearly three times as much for future developments as they pay stockholders." E. W. Tinker, executive secretary, American Paper and Pulp Association.

"Don't make too heavy commitments until present trends can be better evaluated." Col. E. C. Harwood, Economic Research Institute.

▼

"New record production in sight." Dernell Every, Kraft Paper Association.

▼

"Hard times are not coming; soft times are going." M. C. Dobrow, Writing Paper Manufacturers Association.

▼

"This is a time for intelligent optimism." Edwin B. George, Dun & Bradstreet economist.

(Heard during the events of Annual Paper Week)

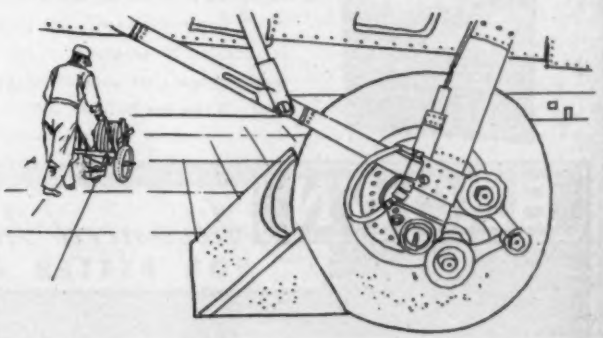
Paper SKETCHES . . . . . .

According to N. LOUIS ROBERT, HE INVENTED THE PAPER-MAKING MACHINE AS A RESULT OF DISGUST OVER THE WAY MEMBERS OF THE GUILD OF HAND-MADE PAPERS BICKERED AND QUARRELED AMONG THEMSELVES.

BEFORE COMING TO PENNSYLVANIA, WILLIAM RITTENHOUSE, AMERICA'S FIRST PAPERMAKER, WAS KNOWN IN AMSTERDAM AS WILLEM RUDDINGHUYSEN VAN MULHEIM, PAPERMAKER

IN THE OLD DAYS, JAPANESE PAPER WAS SO GOOD THAT UMBRELLAS MADE OF THE SUBSTANCE FREQUENTLY STOOD UP TO HARD USAGE FOR YEARS

Paper Cord COATED WITH A RUBBER FILM, IS NOW USED SUCCESSFULLY AS A COMPRESSIBLE CAULKING MATERIAL TO SEAL JOINTS BETWEEN CONCRETE SQUARES IN AIRPORT RUNWAYS



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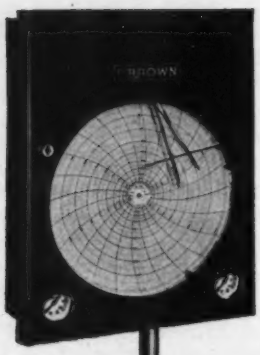

LIQUID LEVEL control assumes extraordinary importance in the Paper Industry. The liquid level controller has a direct effect on chemical concentrations in many processes; and on the mechanical operation of others. From an over-all viewpoint, *precise* liquid level control is vital in maintaining equilibrium of plant processes. Precise control eliminates those upsetting variations that are always dogging production.

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Paper Week Keynote—

"Will Prosperity Remain?"

▸▸▸ PROSPERITY! . . . Will it continue? If so, for how long?

That was the outstanding theme of the seventy-first annual convention of the American Paper and Pulp Association and a score of member and affiliated groups which met in New York City the week of February 22.

The unanimous opinion of paper industry leaders was "there will be no 'bust.'" Some of the guest speakers, economists from other fields, were cautious, but none disagreed sharply with the industry's own analysts.

More than a thousand paper mill executives and representatives of the sales and executive departments attended the convention which opened with group meetings February 22. There were over 800 in attendance at the closing banquet on Thursday evening, February 26, and more than 1,200 at the Salesmen's Association luncheon on Wednesday.

Probably no better survey of the week and the judgment of industry leaders can be given than the valedictory of Reuben B. Robertson, president of the Association for the past two years, when he said:

"Some commentators have seen fit to deduce a prospect of oversupply to be followed by the distress of the thirties. There are other indicators, however, which contradict the 'Gloom Slingers.' Despite all the new capacity, the public actually is consuming most of the paper it buys and it is buying all we can make." He added that the only problem he could visualize was a return to more active salesmanship at any time capacity catches up to demand. (Mr. Robertson's address appears on another page in this section.)

Mr. Robertson, president of Champion Paper and Fibre Company, in concluding his address at the convention banquet, the last formal event of the week, turned over the gavel to Cola G. Parker, president of Kimberly-Clark Corporation (Neenah, Wis.), who pledged himself to give his best efforts toward maintaining the type of leadership provided by those who have preceded him in the Association presidency.

The annual meeting of the Association's Executive Committee and Board of Governors held on Convention Thursday, was devoted entirely to a review of the year's work of the Association, with no guest speakers.

The report which provided probably the most general interest was that of the Statistical Committee which stated that 1948 paper and paperboard production very likely will reach the astounding total of twenty-two million tons, nearly a million tons above the 1946 output, and a total running into several million tons more than in any year of the prewar period. The forecast, assuming a continuance of present trends, predicted a thirty-million ton consumption in 1955, of which 5,000,000 tons would be imported. By the end of this year, theoretical capacity will have reached twenty-three million tons, and present output is running at more than 100 per cent of rated capacity. This means machines are running seven days a week, with minimum time out for clean-up and repairs.

The report of the Public Affairs Committee covered many subjects in which legislation at Washington and the various states is under consideration. Such matters as legislation on stream improvement, efforts to prevent any further movements toward tariff rate changes and taxation legislation were only some of the subjects in the hands of this committee.

Developments in the Association's forestry program and other fields were similarly reported.

Before this meeting, however, the various group associations held their annual meetings and in most of these gatherings the question of the future also was discussed in detail.

In the Writing Paper Manufacturers Association and the Sulphite Paper Manufacturers meeting somewhat divergent views were expressed as to the future. M. C. Dobrow, the Writing Paper Association's executive secretary, was anything but pessimistic, saying that the inflationary boom has cracked and there is no indication of hard times coming—rather it is indicated that soft times are going out. On the other hand, Col. E. C. Harwood, director and trustee of the American Institute for Economic Research, warned against making large capital investments in new productive capacity before the present situation has been clarified.

At other meetings, there was discussion of the increase in imports. Printing paper imports, for instance, have increased from less than 10,000 tons in 1938 to 75,000 tons in 1947. Kraft, fine paper, sulphite wrappings, and other grades have experienced an increase in 1947 of from two to three times the volume that was shipped to this country in 1946.

In the Groundwood Paper Manufacturers Association meeting, R. E. Canfield, its executive vice president, said that groundwood grades were showing an increased demand over the prewar period, but with a trend toward higher grades. He said: "The day of any price for any paper and no questions asked seems to be pretty definitely passed." Mr. Canfield believed the excessive demand for printing papers was clearly past its peak.

Darnell Every, secretary of the Kraft Paper Association, said that six new machines will be in operation by the end of the year, indicating a still further increase over the 1947 record of over 2,000,000, the first time this figure has been reached. He said the principal shortage was in the wrapping grades, because of the ability to produce a larger volume on machines devoted to large converter grades. In the minor converter grades, he pointed out, the frequent changes required by consumer special specifications cut down output volume.

Edwin B. George, economist for Dun & Bradstreet, told the tissue paper manufacturers he was optimistic over the future.

Materially increased shipments of Scandinavian pulp to the American market was reported in other addresses.

In the twenty-odd group meetings these and similar statements were made. The past year, for instance, showed an output of 1,210,000 tons of fine papers, a 4 per cent increase over the previous record established in 1946 with every indication of a further increase in 1948.

While the Association devoted most of its attention to innermost industry problems, its broad attitude toward the nation and business at large was expressed by President Robertson in his closing remarks, when he said:

"The Paper Industry, as a whole, accepts with alacrity its civic and national responsibilities, and can be relied on to co-operate freely and cordially in any program involving the public interest. The industry will not have to be compelled to do its duty."

Appleton Felts

MAKE GOOD PAPER

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Record Attendance Marks the

71st Annual APPA Meeting

▸▸▸ WITHOUT QUESTION, a new attendance record was established at the 71st annual convention of the American Paper and Pulp Association and affiliated organizations at the Waldorf-Astoria Hotel in New York City on Sunday to Friday, February 22 to 27, inclusive. Paper and pulp manufacturers representing nearly every section of the United States, and Canada also, flocked to New York to participate in the almost myriad of meetings, conferences and social get-togethers during the six-day gathering of the industry. From just about every angle, it was a very successful convention.

Cola G. Parker, for the last four years first vice president of the APPA, was advanced to the presidency of the Association at the annual meeting of the Association's Executive Committee and Board of Governors in the Jansen Suite of the Waldorf-Astoria on the morning of February 26. Mr. Parker succeeds Reuben B. Robertson, executive vice president of the Champion Paper and Fibre Company, Hamilton, Ohio, who has served as president of the Association for the last two years.

The new APPA chief executive is president of the Kimberly-Clark Corporation, of Neenah, Wis., and is also well known through his official positions in many Wisconsin and national organizations, as well as in a number of corporations in which he is interested. He is a trustee of the National Industrial Conference Board, a director in the National Association of Manufacturers, a director of the Wisconsin Manufacturers Association, a trustee of Lawrence College, of Appleton, Wis., and a director in the Port Washington National Bank and Trust Company, the First National Bank of Neenah, Wis., and the First National Bank of Appleton, Wis.

R. K. Ferguson, president of the St. Regis Paper Company, New York City, was elected first vice president to succeed Mr. Parker, and the following additional vice presidents were elected:

D. K. Brown, president of the Neenah Paper Company, Neenah, Wis.; Hugh J. Chisholm, president of the Oxford Paper Company, New York City; F. G. Coburn, president of the Brown Company, New York City; Sydney Ferguson, president of The Mead Corporation, New York City; R. L. Fitts, president of the Southern Advance Bag and Paper Company, Boston, Mass.; P. H. Glatfelter, president of the P. H. Glatfelter Company, Spring Grove, Pa.; J. H. Hinman, president of the International Paper Company, New York City; D. S. Leslie, vice president of the Hammermill Paper Company, Erie, Pa.; David L. Luke, Jr., president of the West Virginia Pulp and Paper Company, New York City; R. A. McDonald, vice president of the Crown Zellerbach Corporation, San Francisco, Calif.; and J. L. Madden, president of the Hollingsworth and Whitney Company, Boston, Mass.

Earl W. Tinker was again elected executive secretary and treasurer of the Association.

With this convention, the American Paper and Pulp Association resumed its custom of an annual dinner. During the war years, and since, the dinner was replaced by a luncheon. With retiring President Robertson presiding, and more than 800 persons present, the dinner was held in the Grand Ballroom of the Waldorf-Astoria Hotel on Thursday evening, February 26. It was truly a gala and interesting affair. President Robertson addressed the diners as follows:

Cola G. Parker, newly-elected president of the American Paper and Pulp Ass'n

President's Address

Let me confess that when I took over this gavel two years ago, I had only a mild appreciation of the scope and variety of the activities for which I was assuming responsibility. It has been a constant revelation to me to witness first hand the incessant parade of issues which in any proper perspective assume industry-wide proportions.

I think we are fortunate indeed in possessing, to deal with such problems, a mature hierarchy of associations, culminating in the American Paper and Pulp Association, which permits us to assemble the full weight and experience of the industry whenever occasion requires.

Not the least task attempted during the past two years, has been the effort to improve and consolidate that structure. With the end of the war the question was raised as to the postwar justification for some of the Association's activities and services.

The Board of Governors appointed from its membership a committee of four to investigate the whole range of Association activities, their relation to the activities of the divisional associations, their usefulness and their cost. Obviously it is in the interest of all concerned to avoid duplication of effort where duplication is found and to provide supplementary service where that need appears. The Board of Governors was most fortunate in the type of men who consented to take on this onerous and rather thankless job.

This committee has been at work for several months. Its task was large and it now has submitted its final report. Judging from the interim reports, the committee has studied the

Reuben B. Robertson, retiring president of the APPA

problems carefully and objectively and I am very sure has offered suggestions that will make more effective all co-operative effort within our industry.

Probably the problem most basic to the whole industry is that of wood supply. During the past two years the Association has continued its policy of promoting, in co-operation with other organizations such as the American Pulpwood Association, and the American Forest Products Industries, the adoption of forestry and wood procurement practices which tend to preserve the nation's woodlands as a self-replenishing source of raw material. The Association has been especially active in attempting to open up new sources of wood as and when economic conditions permit. For instance, the Association this fall took the initiative in bringing together representatives of various interests; pulp and paper companies, who are potential users; the Forest Service and railroads, whose co-operation can and well may result in economic access to the vast stands of pulpwood species in the National Forests of Colorado, Montana, Wyoming, and Southern Idaho.

Another problem common to all companies is that of industrial relations. The Association has for several years been evolving through its Industrial Relations Committee a comprehensive exchange of data pertinent to the major aspects of this problem.

It is gratifying to report that during the past two years, this service of the Association has received increasing favorable comment from both within and without the Association. It is now, I believe, a mature and permanent feature of the Association's program.

One of the major responsibilities of the Association lies in the field of public affairs.

At the end of the war many of us entertained the fond hope that the Government would get out of business and business out of Government. Events of the postwar years have belied this hope at least in part.

Through our Washington office, our Public Affairs Committee and our Council to the Department of Commerce, we have tried to keep abreast of developments which might affect our industry and to take such action as occasion required. It is my hope that in view of the dramatic way the industry has expanded to meet postwar demands we will be able to escape the tentacles of bureaucratic controls.

The paper industry has always called for high capital investment per worker employed. Today this ratio is higher than ever before. In fact, I am advised that it is now $18,500—the highest in any industry. The responsibilities implicit in this ratio have

E. W. Tinker, executive secretary of the APPA

brought men of very high calibre into the Industry, executives and workers alike, Like Paul of Tarsus who proclaimed proudly, "I am a citizen of no mean city," I am very proud of the fact that I am connected with "no mean industry." The Industry, as a whole, accepts with alacrity, its civic and national responsibilities, and can be relied on to co-operate freely and cordially in any program involving the public interest. The Industry will not have to be compelled to do its duty.

A number of specific problems in legislation have arisen, probably the most important was a series of bills for stream improvement, all of which, as originally written, would have subjected our operations to bureaucratic regulation.

In our presentations before Congressional Committees considering these bills, we tried to make it clear that the industry appreciates the necessity for improving the condition of many streams, but that in view of aggressive and constructive programs under way in many of the states we do not agree that the Federal Government should or can assume overriding responsibility.

The form in which a committee bill emerged and was passed by the Senate, seems in large part an acceptance of our views.

I am encouraged to hope that a similar bill will soon appear in, and be passed by the House; thus for the time being at least, bringing to a halt most of the agitation for more severe federal legislation.

During the past two years the Forest Industries Information Committee project, by which we attempt to keep public officials aware of the industry and its importance to the communities from which they come, has been enlarged and strengthened. We now have thirty-three committees in thirty-three states. The co-operation of the National Lumber Manufacturers Association and the American Pulpwood Association, who share with us the expense of this project, has become increasingly more active.

Statistics are often regarded as at best dull and often meaningless. Yet in these restless and confused times, it is impossible to operate without the knowledge they provide. No company can operate for long in a vacuum—it has to know where it stands competitively and where its industry stands in National and World scenes. Thanks to years of accumulation by the divisional associations and the American Paper and Pulp Association, our industry is able to maintain as complete a statistical program as any in the country. These figures have several times during my term of office, provided us with ammunition sorely needed to protect us from dangerous propaganda.

One of the results of the investigation by the Board of Governors' Review Committee has been to convince us that the reports we ask our companies to send in are important and useful. I cannot urge you too earnestly to continue your co-operation.

The postwar years have witnessed an impressive expansion of papermaking capacity. We have attempted to keep track of this expansion by repeated surveys of new capacity, the results of which have been widely distributed and are by now familiar to you all.

Some commentators have seen fit to deduce from these reports a prospect of over supply to be followed by the distress of the thirties which no one can forget. There are other indicators, however, which contradict the "Gloom Slingers."

Despite all the new capacity, the public is, so far as we can tell by the yardsticks available, actually consuming most of the paper it buys and it is buying all we can make. Unless something unforeseen happens to this demand, I seriously doubt that we have anything to fear from expanded capacity beyond a return to the need of active salesmanship.

Even if current demand for conventional paper grades should diminish, there are a multitude of new uses for paper waiting only on freer supply. It is not unreasonable to hope and expect that this deferred demand can take up such slack as develops, provided the price of paper remains competitive with other commodities seeking the same outlet.

During the two terms of office in which I have had the honor of serving

WHY a NORTHWEST CRAWLER makes a better Paper Mill Crane!

LOOK at this job! Can you picture any other type of material handling equipment solving a problem like this? Here is a *Key Spot*, the heart of your job—getting pulpwood into and out of the pond or the pulpwood yard. Shut down your cranes and you shut off the life blood to your plant.

Your Northwest brings you unequaled versatility. It goes anywhere. It loads or unloads from the side without an extra line of track or it unloads from the end. Your Northwest can unload a whole train of pulpwood without moving a car.

Add to this the fact that you can move it anywhere about the mill . . . power plant . . . receiving station or loading dock and it handles any type of material or load within its rated capacity. You can't afford anything but the best for those *Key Machine* spots at the heart of the job. Plan now to have Northwest equipment.

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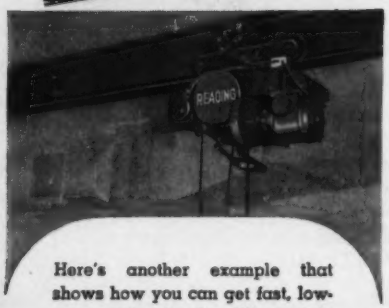
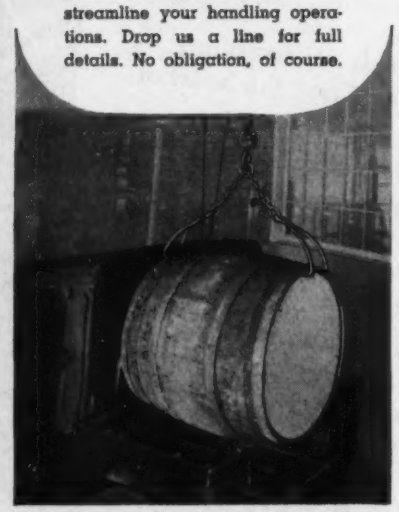
Streamlines
MATERIAL HANDLING



Here's another example that shows how you can get fast, low-cost materials handling, right now. Before installing a *Reading* engineered system, this plant had to wheel heavy barrels to the mill via hand trucks. To streamline the operation, *Reading* Engineers were called in. A one-ton Reading Electric Hoist, operating on a built-in parallel trolley, was recommended. Now barrels move faster—less manpower is tied up—and the entire operation costs far less!
Let Reading Engineers give you *practical* suggestions that can streamline your handling operations. Drop us a line for full details. No obligation, of course.



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READING HOISTS

as your presiding officer, I have had regular contacts with the members of the board of governors—with the members of the executive committee and with the staff. I have found these contacts delightfully pleasant, stimulating and informative. I am deeply appreciative of the unfailing support and co-operation that have been given me in such full and generous measure.

More than ever before I feel that we can all be very proud of the type of men who are in positions of executive responsibility in our great industry.

I am indeed grateful to the membership of the Association for the opportunity they have given me for a more intimate knowledge of the Industry and the men who guide it.

I turn over to my successor, the presidency of the American Paper and Pulp Association, with its responsibilities, knowing it will be in good hands. He is fully aware of the effective organization available in the Association's administrative staff. I am sure he will have the same loyal and effective support that I have enjoyed.

Prior to President Robertson's address, Miss Virginia MacWatters, coloratura soprano, rendered several vocal selections, and was accorded much applause. During the serving of dinner there were strains of popular, oldtime and semi-classical music from an orchestra located in the first balcony, interspersed by vocal renditions by a tenor and a baritone vocalists.

On the ballroom stage, on a two-level dais, were seated some two score officers, past presidents and group executives of the Association, and guests of honor. President Robertson introduced George W. Sisson, Jr., president of the Racquette River Paper Company and a former APPA president of 30 years ago or in 1918; R. M. Fowler, president of the Canadian Pulp and Paper Association; E. E. Norris, president of the Southern Railway System; R. L. Williams, president of the Chicago and North Western Railway System, and John M. Hancock, partner in the firm of Lehman Brothers and former member of the United States delegation to the United Nations Commission on Atomic Energy Control.

Mr. Fowler brought greetings from the Canadian pulp and paper industry to the American industry, and spoke on conditions in the industry across the northern border, asserting that 1947 was the most successful year the Canadian pulp and paper industry has ever enjoyed in its long history.

Mr. Hancock, the principal speaker of the evening, held his audience practically spellbound for more than an hour in telling of the tremendous power of atomic energy, of what it could accomplish in an industrial or beneficial sense, and of the difficulties, chiefly created by Russia, now standing in the way of proposals for outlawing or controlling the atomic bomb. Until these difficulties are eliminated, if they are to be eliminated, he said, "it is best to go ahead with the manufacture of as many bombs as the United States can produce." He stressed that outlawing the bomb would not in itself prevent war, and added that he was opposed to its use for aggression, but not "to prevent aggression."

▼

AWARDS ANNOUNCED IN THE THIRD BOLTON CONTEST

Winners in the Third Bolton Award Contest, which closed October 1 (1947), have now been announced. This contest is conducted annually by John W. Bolton & Sons, Inc., under the auspices of the American Pulp and Paper Mill Superintendents Association, Inc.

The subject of the contest, for which awards have just been made, was "My Plan for Improving the Safety Record in the Pulp and Paper Industry." This subject evoked wide interest which is indicated by the large number of papers submitted.

Prize winners are as follows:

National Contest

First Prize—($1,000) Ted Perry, Orchard Drive, Lewiston, New York.

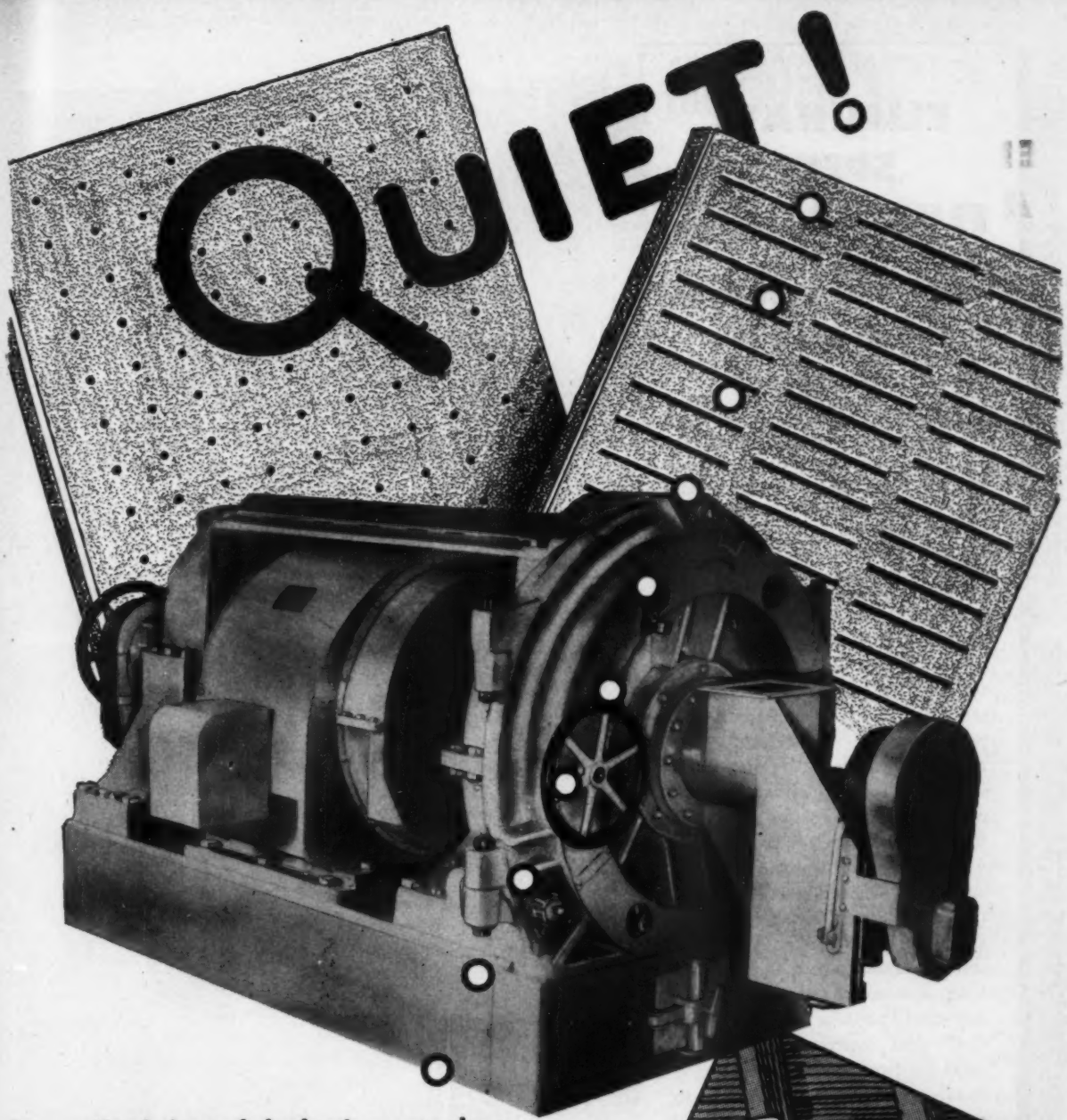
Second Prize—($750) E. A. Page, Kimberly-Clark Corporation, Neenah, Wisconsin.

Third Prize—($500) C. L. R. Dougherty, Union Bag & Paper Corporation, Savannah, Georgia.

Divisional Winners—($100 each)

Connecticut Valley—Thomas P. McDonnell, Tileston & Hollingsworth Company, Hyde Park, Massachusetts; *Miami Valley*—George W. Harper, The Mead Corporation, Chillicothe, Ohio; *Michigan*—Gordon Morseth, Detroit, Michigan; *New York-Canadian*—George W. Holland, International Paper Company, Palmer, New York; *Northeastern*—Edward L. Lincoln, S. D. Warren Company, Cumberland Mills, Maine; *Northwestern*—Richard L. Talbot, Kimberly-Clark Corporation, Neenah, Wisconsin; *Pacific Coast*—Fred R. Sievers, Washougal, Washington; *Pa.-N.J.-Del.*—Frederick W. Judge, Ilchester, Maryland; *Southeastern*—C. A. Howard, West Virginia Pulp & Paper Company, Charlestown, South Carolina; *Southern*—R. H. Morrell, Southland Paper Mills, Inc., Lufkin, Texas.

The thirteen prize-winning papers will be published in book form and distributed by John W. Bolton & Sons, Inc.



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Sprout-Waldron Refiners can play a vital part in this production by reducing partially cooked chips to strong, slender fibers . . . which in turn become quality insulating board.

Between these tough wood fibers . . . millions of tiny dead air cells are formed . . . every one of which acts as a barrier to the passage of sound. Increased porosity through Sprout-Waldron Refining, also permits extended surface coverage per ton of pulp.

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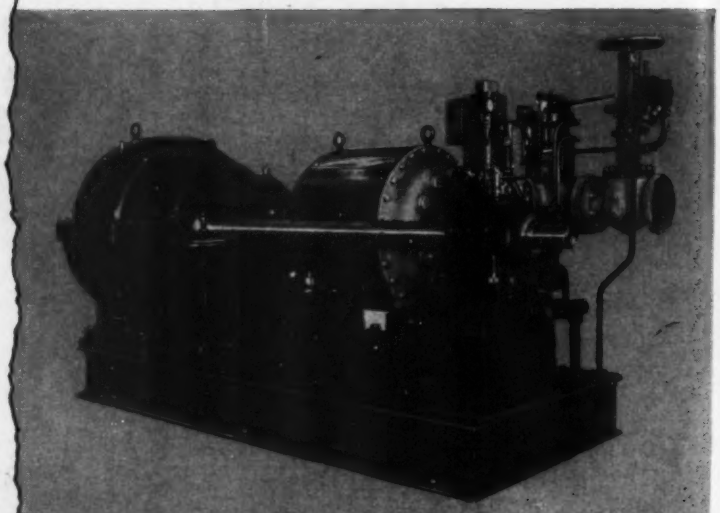
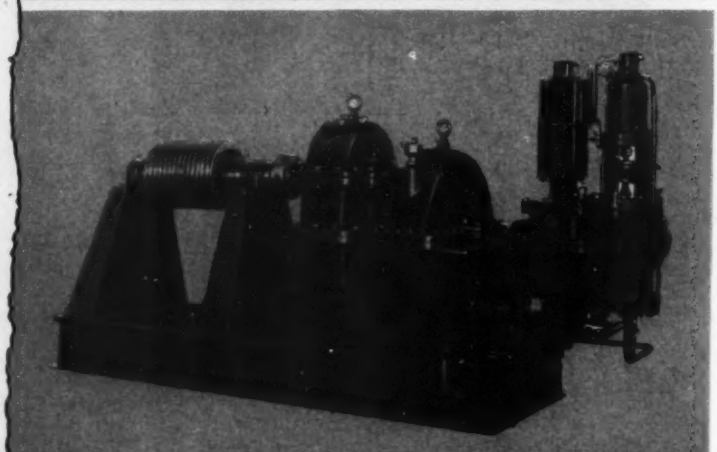
Continuous steady speed operation invariably follows when Worthington Steam Turbines take over the driving job The isochronous governor assures no change in operating speed from minimum to maximum load for any given control setting A special single-seated governor valve or valves give stable operation at low loads. In addition, the governor is adjustable over complete range to accommodate any paper machine requirement — remote speed controls can be provided if desired. Turbine-driven auxiliary oil pump protects against shutdown from power failures.

Whether your conditions call for automatic or hand nozzle control, direct connection or belted to line shaft, you can depend on Worthington to manufacture a smooth-running, economical steam turbine for any size of paper or board machine. Call your nearest Worthington office for more information proving that — in steam turbines as in so much other equipment — *there's more worth in Worthington*. *Worthington Pump and Machinery Corporation, Steam Turbine Division, Wellsville, New York.*



Worthington Steam Turbine with double extended gear shaft for direct connection into the line shaft of a large paper machine

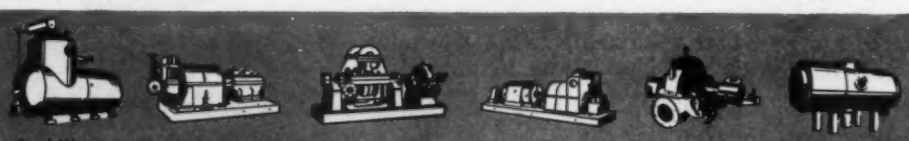


A small Worthington paper machine drive unit for belting to drive shaft

WORTHINGTON

77-4

A GREAT TEAM IN STEAM



Paper Industry's Growth Indicated by Annual TAPPI Meeting

▶▶▶ THE THIRTY-THIRD annual meeting of the Technical Association of the Pulp and Paper Industry was held at the Commodore Hotel, New York City, February 23 to 26, 1948. More than 1500 people registered their attendance, including members and others in the pulp, paper and related industries who participated in the divisional meetings of the extensive program. Chairman of the meeting was TAPPI President W. F. Gillespie.

Report of Secretary Macdonald

R. G. Macdonald, secretary-treasurer of TAPPI, in presenting his annual report, stated that the general prosperity of the pulp and paper industry reflected itself in the growth and activities of the Technical Association in 1947. There were 506 individual members elected in 1947, bringing the total individual membership on December 31, 1947, to 3101. The corporate membership on that date was 201 and the sustaining membership was 164.

Mr. Macdonald reported that in July, 1947, the Association sustained the loss of its president, Worthen E. Brawn, who died suddenly while enroute to Europe. He also recalled the names of twenty-two other members who were lost to the Association during the past year through death.

Four special reports were made on the basis of surveys by the Association's committees and by independent investigation by the central office staff. They were: Insulation Board Stock Testing; Preparation of Halfstock from Cotton Fiber; Testing of Cotton Fiber; and Process Water Used in the Manufacture of Papers Containing Groundwood. Several other reports started in 1947 are in process of being completed.

Mr. Macdonald mentioned that during the past year the Association Technique de l'Industrie Papetiere was formed in France. This body which is patterned after the Technical Association was organized after a number of French papermakers visited the United States and had an opportunity to investigate the organization and its activities in this country. A similar organization was formed by the representatives of the industry in Australia.

Under the leadership of Harold R. Murdock, a former officer of the Technical Association, the Technical Association of the Pulp and Paper Industry of Japan was organized in February, 1947, in Tokyo. This is the first organization of its kind organized in the Japanese paper industry.

The TAPPI Standards and Data Sheets were translated into the Czech language by R. L. Rys of the Harmanec Paper Mill Ltd. in Slovakia.

Co-operation has continued relative to the development of testing standards with the American Standards Association, the American Institute of Mechanical Engineers, the American Chemical Society, and the American Society for Testing Materials.

Mr. Macdonald reported that the Association is participating in the work of the Wood Chemistry Committee of the United Nations Food and Agricultural Organization. In particular the Association is co-operating in the work of the Subcommittee on Nomenclature, Testing and Specifications. On this subcommittee are representatives of the principal pulp and paper technical organizations throughout the world.

In addition, a co-operative arrangement has been established between the Association and the Technical Sections of the Canadian Pulp and Paper Association and the Technical Sections of the Canadian Pulp and Paper Association, and the Papermakers' Association of Great Britain and Ireland wherein the new testing methods developed by each association is referred to the others for suggestions and criticisms prior to official adoption.

Mr. Macdonald referred to the following five highly successful TAPPI meetings of last fall: (1) Appleton, Wisconsin, September 3-5, sponsored by the Fundamental Research Committee; (2) Syracuse, New York, September 25-26, sponsored by the Plastics Committee; (3) Asheville, North Carolina, October 9-11, sponsored by the Alkaline Pulping and Chemical Products Committee; (4) Alton, Illinois, October 23-24, sponsored by the Fibrous Agricultural Residues Committee; and (5) Philadelphia, Pennsylvania, November 3-5, sponsored by the Engineering Division and designated as the Second Engineering Conference of the Pulp and Paper Industry. Fall meetings that are being planned for 1948 are mentioned in the President's address on another page in this issue.

The Secretary made reference to a number of technical publications that were issued during 1947 by the Association. These included one monograph entitled "Pulpwood Stands, Procurement, and Utilization"; a ten-year Bibliography of Technical Literature published between 1936 and 1945, and another covering the literature of 1946 plus the U. S. Patents issued in 1945 and 1946—both of which were compiled by Clarence J. West of the Institute of Paper Chemistry, Appleton, Wisconsin; twelve Standard Testing Methods; Data Sheets, and the TAPPI Bulletins. The annual, cloth-bound Technical Association Papers will be ready for publication early this year, having been delayed by printing plant limitations. The papers presented at the national meetings of the Association, the tentative standards and miscellaneous contributed articles were published in the *Paper Trade Journal*. This arrangement between the Association and the Journal has been in existence since 1921.

President's Address

In opening his address as president of TAPPI, Wilbur F. Gillespie paid tribute to the leadership of the late Worthen Brawn and expressed his appreciation for the co-operation of individual members and committees when it became necessary for him to assume the duties of president.

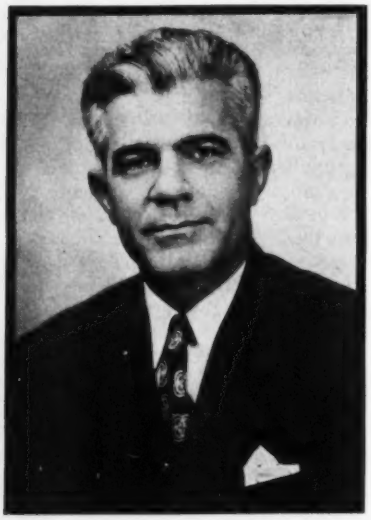
Reviewing the accomplishments of the past year, Mr. Gillespie commended the fine leadership of TAPPI committees which he believes are largely responsible for the growing strength of the Association. To illustrate the important need filled by the Engineering Division, Mr. Gillespie remarked that of a group of over 30 applications for membership that came across his desk recently, 61 per cent were from engineers and several were from chief engineers of paper companies.

Mr. Gillespie referred to the invitation of the Pacific Coast Section to hold the Annual 1949 Fall Meeting of TAPPI on the Pacific Coast and urged members and committees to arrange to attend this meeting.

At least four Fall Meetings will be held this year. Preliminary arrangements have been made for the third engineering conference to be held in Buffalo on October 25-28 under the sponsorship of Westinghouse Electric Com-

pany. The Fundamental Research Committee is planning the third of its series to be held at Madison, Wisconsin, on August 17-20 with a program on the physical properties of wood species.

The testing division meeting in Pittsburgh on October 11-13 is being planned around several group discussions, dealing with various phases of testing. The fourth meeting that is planned is a 3-day symposium to cover the field of mechanical pulping which will be held at Poland Springs, Maine, September 27-29. This project was originated by Worthen Brawn and it is felt it will be a worthy tribute to him. The program expanded until now it has become a joint meeting with the Canadian Technical Section and TAPPI as the co-sponsoring groups. It



Wilbur F. Gillespie, elected president of TAPPI for the coming year

is believed a monograph on groundwood will be developed from this meeting.

The decision of the executive committee that TAPPI should sponsor its own official publication was referred to by Mr. Gillespie. Starting January, 1949, the TAPPI Journal will appear as a monthly publication devoted to scientific articles, local sections, and other TAPPI news. He stated that it is hoped the quality of TAPPI service will be improved thereby and that eventually a TAPPI journal will take its place among the leading scientific journals of the day.

Mr. Gillespie reported that new monographs to be released shortly include the monograph on wood constituents which resulted from the Appleton meeting, a monograph on resins for coating, and monographs on pigments and adhesives for coating. Four other monographs under preparation treat of the drying of paper, graphic arts, water, and machinery for coating. In addition, Mr. Gillespie announced the plans of TAPPI to provide a collection of routine control methods and to publish a book on the bleaching of cellulose.

New Officers

The next report on the program was the announcement of the results of the election which had been conducted by mail ballot. The 1948 TAPPI officers are: President, Wilbur F. Gillespie, Gaylord Container Corporation, Bogalusa, Louisiana; Vice President, Alber E. Bachmann, Missiquoi Corporation, Sheldon Springs, Vermont. Members of the Executive Committee, Harold W. Bialkowsky, Weyerhaeuser Timber Company, Everett, Washington; Frederick C. Goodwill, St. Regis Paper Company, Deferiet, New York; Willis B. Lincoln, Jr., Inland Container Corporation, Indianapolis, Indiana; Albert L. Sherwood, Sutherland Paper Company, Kalamazoo, Michigan.

Reports on Textbooks— U. of Maine Activities— & Patent Office Plans

R. S. Kellogg, secretary of the Joint Textbook Committee, reported on the progress in the preparation of the four-volume series entitled *Pulp and Paper Manufacture* which will replace Volumes III, IV, and V of the present textbook series. Titles of the new volumes are: *The Manufacture of Wood Pulp, The Preparation of Paper Making Stock, The Manufacture of Paper* and *Auxiliary Mill Equipment.* The McGraw-Hill Book Company estimates the first volume of the series will appear in the latter part of 1948. In view of the small but steady demand for Volumes I and II of the present series, their sale will be continued under a slightly different title.

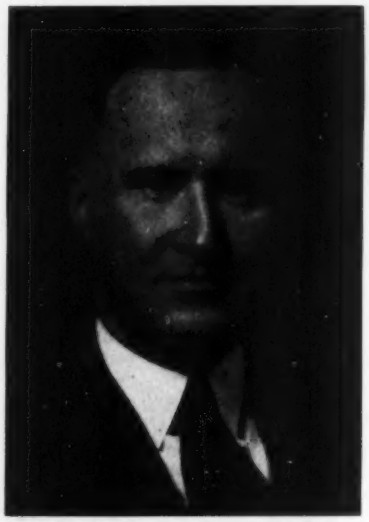
The activity of the Department of Industrial Co-operation of the University of Maine was reviewed by its director, L. C. Jenness. The role of a typical state university in fostering and developing research in co-operation with industrial companies was illustrated by his description of the organization of the University of Maine's department. Under this plan the sponsor agrees to finance the cost of the investigation including a charge for salaries, supplies, special equipment, depreciation, and overhead, while the University provides the space, stock equipment, and personnel. The results are the sole property of the sponsor and are not published without his approval.

Another report was that of Lawrence C. Kingland, U. S. Commissioner of Patents, Washington, D. C., who discussed present patent office practices and future plans. He stated that about twenty months are needed to examine applications and that there is at present a backlog of about 145,000 cases.

Monday afternoon was given over to a Congress of Committees held in the Grand Ball Room of the hotel. At this time individual committees convened at separate tables to discuss plans for the technical sessions which were scheduled throughout the following days.

Brig. Gen. Brougher Guest Speaker at Luncheon

The final event of the four-day meeting was the annual luncheon on February 26 which was presided over by President Gillespie. A unique introduction of the luncheon guests was presented by Mr. Gillespie in the form of



R. G. Macdonald, Secretary of TAPPI

an interesting narrative. The recipient of the 17th gold medal of TAPPI, Dr. E. F. Heuser, is retired and now living in southern California. It was announced that presentation of the award would be made at a meeting of the Pacific Coast Section.

Brig. Gen. William E. Brougher, Commanding Officer at Camp Gordon, Georgia, was introduced as the guest speaker by Vertrees Young, executive vice president of Gaylord Container Corporation. Holder of the Distinguished Service Medal, General Brougher spent several years in Japanese prison camps. His address entitled "Beware of False Prophets" was an urgent message relating to war and its effects.

College Alumni Luncheons

Individual luncheon meetings for the alumni of the University of Maine, New York State College of Forestry, and Massachusetts Institute of Technology were held in keeping with a

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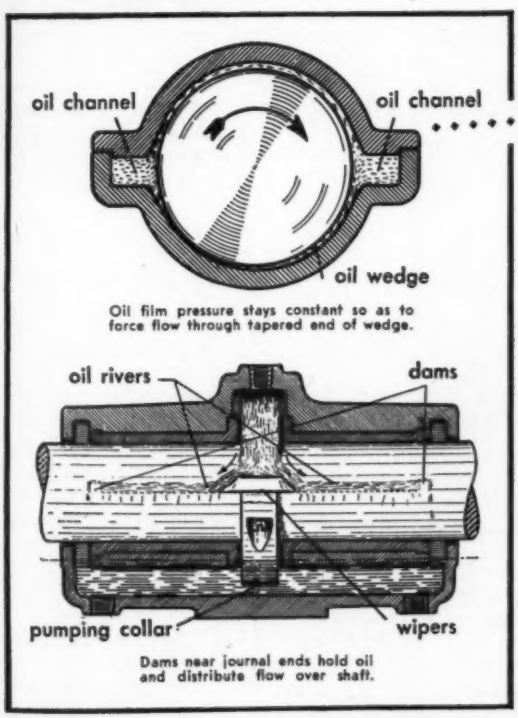
oil channel
oil channel
oil wedge
Oil film pressure stays constant so as to force flow through tapered end of wedge.
oil rivers
dams
pumping collar
wipers
Dams near journal ends hold oil and distribute flow over shaft.

. . . . . shaft floats on wedge-shaped oil film

This bearing carries heavier loads, operates at higher speed, gives uninterrupted flow of power. Out-does many ordinary bearings because it is friction-free and void of metallic contact. Bearing and shaft never touch! A flowing wedge-shaped film of oil forms a cushion on which the shaft floats free. Flow is always ample. Maintenance is minimized. Large capacity oil reservoir built in the bearing bottom seldom requires refilling.

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well established practice. The alumni of the University of Maine met for luncheon on February 24 and the alumni of the other two schools met on February 25.

Ninety-six Papers Presented

Twenty-one sessions convened during the four-day gathering. Before these groups 96 papers were presented (some by title). Listed herewith are the subjects of those papers, the authors, and the sessions for which they were scheduled:

Acid Pulping

Four papers were presented at this session, with George H. McGregor, Minnesota & Ontario Paper Company, acting as chairman:

Sulphite Semichemical Pulping of Chip Screenings, by Lyle C. Jenness, University of Maine, and George L. Nystrom, Eastern Corporation.

Review of the Status of By-products from Sulphite Pulping, by Harry F. Lewis, Institute of Paper Chemistry.

Modern Practice in Sulphite Mill Acid and Recovery Plants, by Frank J. Hoar, G. D. Jenssen Company.

Recent Developments in Sulphite Pulping, by John F. Inderdohnen, Chemipulp Process, Inc.

Pulping

Six papers were presented at this session with John A. Hanson, Badger Paper Mills, serving as chairman:

Pulping Southern New England Hardwoods, by Robert S. Aries, Polytechnic Institute of Brooklyn.

Effect of Petroleum-Base Additives in Pulp and Paper Making, by W. A. Beman and H. E. Corbin, Socony Vacuum Oil Company.

Observations on Bleaching Groundwood Pulp, by F. A. Simmonds and Ralph M. Kingsbury, Earle S. Lewis, and Forrest A. Simmonds, Forest Products Laboratory.

Production of Liner Boards from Jack Pine and Hardwood Semichemical Pulps, by J. N. McGovern, G. E. Makin, and G. H. Chidester, Forest Products Laboratory.

De-inking Studies (III.) Survey of a Production System by Screen Analysis, by H. P. Bailey, A. H. Nadelman, and E. F. Andrews, International Paper Company.

Factors Influencing Properties of Mechanical Pulp, by M. Vilars, S. A. Papeteries Darblay, Paris, France (by title).

Microbiological Control Methods

J. W. Appling, Buckman Laboratories, presided as chairman at this session. Three papers and a panel discussion were presented:

The Foaming Properties of Various Chlorinated Phenols, by C. R. Haefele, Eastman Kodak Company.

Panel Discussion on the Evaluations of Toxicants for Use in the Paper Industry. (Participants: Robert F. DeLong, Marathon Corporation; Glen King, Crown Zellerbach Corporation, and George A. Cruickshank, National Aluminate Corporation.)

A Method for the Determination of the Resistance of Paper and Paperboard to Penetration by Fungi, by B. F. Shema, Institute of Paper Chemistry.

TAPPI Medal Awarded to *Emil Heuser*

▶▶▶ The 1948 medal of the Technical Association of the Pulp and Paper Industry has been awarded to Dr. Emil Heuser (retired), formerly professor at the Institute of Paper Chemistry, Appleton, Wisconsin.

This award, which is the most important in the industry, is given to an individual who is considered to have made an outstanding contribution to the technical advancement of the pulp and paper industry.

Emil Heuser was born at Stralsund, Germany, September 15, 1882, and attended the Technical Universities of Munich and Karlsruhe. Following graduation, he started his work in the paper industry in the rag paper mill of Gebruder Laiblin in Pfullingen, Wurtemburg. Following this he became a chemist for the Pulp and Paper Company of Altdam in Pomerania, one of the oldest sulphate mills. From there he moved to the Zehlendorf Paper Mills near Berlin, producers of photographic papers where he took charge of the coating processes. At his next mill, the Pulp and Paper Company of Steyrermuhl in Austria, he carried on the same work.

While with these companies Dr. Heuser had published various articles dealing with his work and he had become interested in the Technical Association of the German Pulp and Paper Chemists and Engineers. Because of these activities he was selected to be the

successor to Carl G. Schwalbe for the chair of chemistry of cellulose and related substances at the Technical University of Darmstadt in 1912.

Dr. Heuser's activities at Darmstadt resulted in numerous publications pertaining to cellulose, lignin, noncellulose carbohydrates, chemistry of wood, etc. During the first world war he erected a plant in Monheim on the Rhine to make fodder cellulose and alcohol. It was here that probably the first successful attempt to produce furfural on a commercial scale was made.

In 1921 his textbook on Cellulose Chemistry appeared. In 1929 he founded *Celluloschemie,* a periodical magazine. In 1923, he became chief editor of the volumes entitled *Technik* and *Proxis der Papier-fabrikation.* From 1920 to 1926, he was also editor of the technical section of *Der Papierfabrikant,* and from 1918 to 1926 he served as secretary of the German Technical Association.

In 1923, Dr. Heuser terminated his activities at Darmstadt and became research director for Vereinigte Glanzstoff A/G, makers of rayon near Berlin. In 1926, he left Germany and established a research department for the Canadian International Paper Company at Hawkesbury, Ontario, which he directed until 1938. While at Hawkesbury, he helped to develop the Thorne multistage system of bleaching wood pulp. In March, 1938, he joined the Institute of Paper Chemistry staff at Appleton. While at the Institute his book on *The Chemistry of Cellulose* was published by John Wiley & Sons, Inc.

At the end of 1947, Dr. Heuser retired from the Institute and is now living in southern California. Since he was unable to attend the annual meeting of the Technical Association, the medal presentation will be postponed until it is convenient for him to receive it on behalf of the Association at a West Coast point.

Mister-
-You've been Waiting for the "DID"

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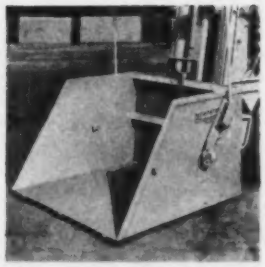

Above skip type body. Below drop bottom body. Note how bottom forms chute for material.

Remarkably versatile and mobile, the new Dempster-Dumpster "DID" provides an efficient and economical intra-plant materials handling system applicable to nearly every industrial operation. With one hoisting unit handling many bodies, this system is ideal for shifting material from point to point in plant and yard operations. On each trip, up to 2500 pounds of material can be picked up and carried inside the plant from yard stockpiles. Ashes or waste can be carried outside, dumped into a bin or truck body not exceeding 94 inches in height.

With the addition of an easily detachable boom extension, which can be elevated to a height of over 21 feet, the "DID" becomes a mobile crane capable of hundreds of tasks such as lifting pipe, scrap, light machinery, steel, etc.

Shown above is the Dempster-Dumpster Type "DID" Tractor Hoisting Unit dumping a tilt-type body. At left top, the tilt-type body is in carrying position, and below Hoisting Unit approaches body to make the pick-up which is accomplished without the driver leaving his seat.

Detachable bodies are made in many designs to suit any need. Photos at right above show, for example, two other standard types. Write today for completely illustrated literature on this remarkable new Dempster development.

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The annual luncheon of the Technical Association of the Pulp and Paper Industry was held in the Grand Ball Room of the Commodore Hotel on the last day of the meeting

Containers

With W. B. Lincoln, Jr., Inland Container Corporation, acting as chairman, three papers were presented at this session:

Instrumental and Operational Variables of the (Jumbo) Mullen Tester, by R. C. McKee, Carlton Rood, and Lewis B. Ayers, Institute of Paper Chemistry.

Load Concentration in Corrugated Paper, by J. H. Toulouse and Paul J. Barcus, Owens-Illinois Glass Company.

Progress Report on the Testing Program of the Shipping Container Institute, by W. B. Lincoln, Jr., Inland Container Company.

Papermaking (Fourdrinier)

At this session three papers were presented with B. L. Kassing, New York State College of Forestry, as chairman:

The Effect of Fourdrinier Operating Variables as Related to Sulphite Papers, by Noel Phillips, Hollingsworth and Whitney Company.

Stock Preparation Conditions Affecting Formation, by Fritz Klein, Byron Weston Company.

Stock Preparation Effects on Formation, by T. M. Barry, Fraser Paper, Ltd.

Papermaking (Cylinder)

Two papers and a panel discussion were presented at this session with O. E. S. Hedbring, United Board and Carton Corporation, acting as chairman:

Features of an Eight Cylinder Board Machine, by Ives Gehring, Oswego Falls Corporation.

Routine Testing Procedures, Cylinder Board Mills, reported by O. E. S. Hedbring.

Panel Discussion on Quality Requirements of Folding Boxboard and How to Meet Them. (Participants: Alan Schumaker, Clifton Paperboard Company; Carl Melenbacher, The Ohio Boxboard Company, Rittman, Ohio; Glen T. Renegar, Container Corporation of America; John F. Halladay, Consultant.)

Graphic Arts

Five papers and a motion picture were presented at this session with R. H. Simmons, Government Printing Office, acting as chairman:

Reproducible Gloss Standards, by Daniel Smith and Marie M. Mahoney, Interchemical Corporation.

Gloss Recorder with Automatic

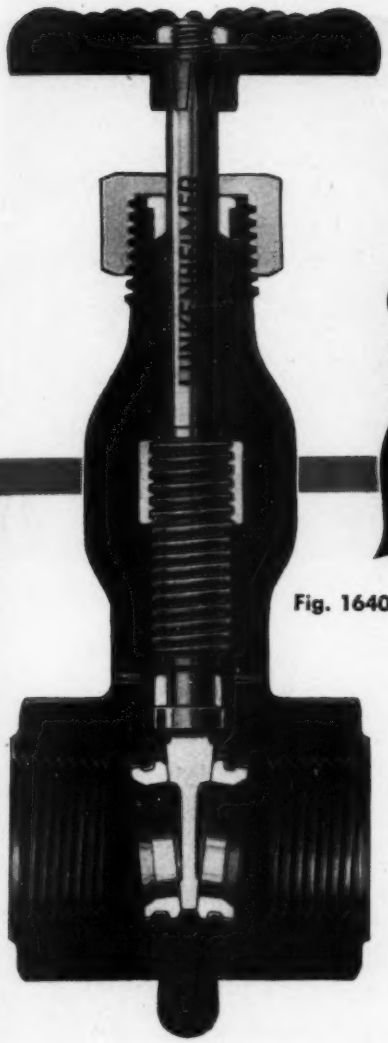

Fig. 1640

YOUR VALVE DOLLAR *Goes Farther—*

with LUNKENHEIMER "KING-CLIP" VALVE

The Lunkenheimer "King-Clip" Valve has one quality feature after another . . . from the coarse, heavy stuffing box threads and hex-head gland which minimize stuffing box troubles . . . to the heavy body which resists wrenching and piping strains . . . and the heavy rust-proofing treatment, inside and out. Each feature adds longer life, lower maintenance and better service, wherever small and medium sized gate valves are used.

Note the ample, unobstructed drain channels and bronze thread bushing, features originated by Lunkenheimer, as was the "King-Clip" Valve itself. The Lunkenheimer "King-Clip" Valve is truly the king of all clip type valves . . . widely used for more than 50 years and, today, better than ever for longer, low-cost service.

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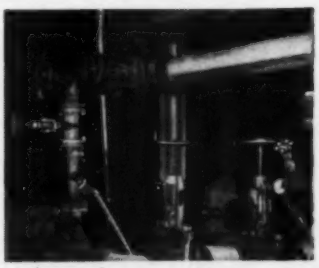
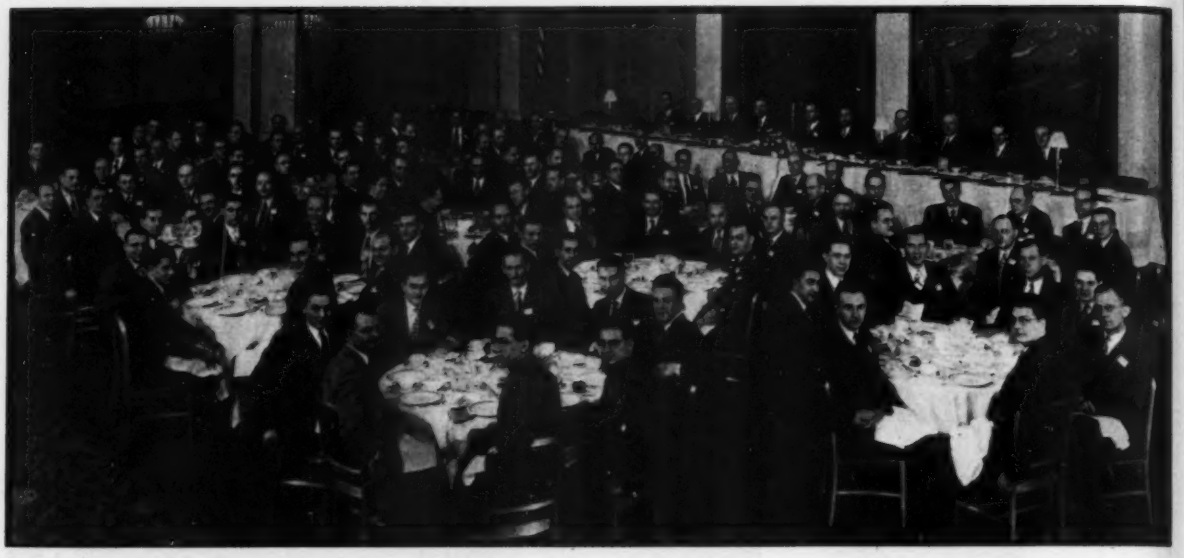


Shown are Lunkenheimer "King-Clip" Gate Valves after seven years of continuous service at a large pulp and paper plant in the South. These valves handle the liquor discharge from a vertical tube evaporator . . . a liquid called "heavy liquor" and termed "very corrosive" by this company. The valves have given "very satisfactory service in this application."

ASK YOUR DISTRIBUTOR

Consult your valve specialist, the friendly near-by Lunkenheimer Distributor. He has a stock of "King-Clip" Valves as well as other fine Lunkenheimer products. Ask for Bulletin 561 which details the 21 standard types of "King-Clip" Valves.



A regular event of Convention Week is the annual luncheon of the New York State College of Forestry Alumni. This year the luncheon was held at the Hotel Roosevelt

Standardization, by Richard S. Hunter, Henry A. Gardner Laboratory.

Testing Printability of Paper with Ink, by Otto P. Berberich, Lou Engelhard and Milton Zucker, Interchemical Corporation.

The Relation of Paper and Ink in High Speed Printing, by E. R. Duffie, Meredith Publishing Company.

Drying of Printing Inks, by Dr. W. J. Walker, National Printing Ink Research Institute.

Motion Picture—"How to Make a Good Impression," by Harris-Seybold Company.

Fibrous Agricultural Residues

A total of seven papers were presented in the two sessions of this committee with S. I. Aronovsky, Northern Regional Research Laboratory, as chairman:

Arundo Donax Pulp, by W. F. Gillespie, Gaylord Container Corporation.

Neutral Sodium Sulphite for Digesting Straw for Corrugating, by B. F. Stahl, Terre Haute Paper Company.

Combined Wheat Straw Again Injurious to Clover Seedings, by C. J. Willard, Ohio Agricultural Experiment Station.

Anaerobic Decomposition of Strawboard Wastes, by Don E. Bloodgood and J. C. Hargleroad, Purdue University.

Agricultural Residue Pulps—Comparison of Pulping Processes, by S. I. Aronovsky, A. J. Ernst, H. M. Sutcliffe, and G. H. Nelson, Northern Regional Research Laboratory.

Agricultural Residue Pulps—High Yield Straw Pulps for Fine Papers, by S. I. Aronovsky, G. H. Nelson, A. J. Ernst, H. M. Sutcliffe, E. C. Lathrop, Northern Regional Research Laboratory.

Further Progress in Continuous Pulping, by R. G. Goodwin, Paper & Industrial Appliances, Inc.

Research Development

At this session with Roy P. Whitney, Institute of Paper Chemistry, as chairman, seven papers were presented:

Nitration of Wood Pulp—Influence of the Physical Condition of Pulp and of the Species of Wood, by Milton O. Schur, Ecusta Paper Corporation, and Douglas H. McMurtrie, Brown Company.

The Effect on Pulp Quality of the Stepwise Removal and Replacement of the Hemicelluloses from Aspen Holocellulose, by Robert E. March, Institute of Paper Chemistry.

Composition Changes Occurring During Vacuum Evaporation, Steam Stripping, and De-ashing of Ammonium Sulphite Waste Liquors, by Aaron E. Markham and Joseph L. McCarthy, Department of Chemical Engineering, University of Washington.

The Pyrolysis of Ammonium Sulphite Waste Liquor to Yield Ammonia, by Aaron E. Markham, Quintin P. Peniston, and Joseph L. McCarthy.

The Solubility of Sulphur Dioxide in Ammonia-Base Sulphite Solutions, by D. E. Marriner, Monsanto Chemical Company, and Roy P. Whitney.

The Solubility of Sulphur Dioxide in Calcium Bisulphite Solutions, by C. K. White, Jr., Hercules Powder Company, J. E. Vivian, Massachusetts Institute of Technology, and Roy P. Whitney.

A Study of the Origin of the Kraft Color, by W. W. Pigman and W. R. Czellak, Institute of Paper Chemistry.

Vocational Training

The following papers were presented at this session with B. E. Lauer, University of Colorado, serving as chairman:

University Training on the Graduate Level, by Harry F. Lewis, Institute of Paper Chemistry.

University Training on the Undergraduate Level, by E. C. Jahn, New York State College of Forestry.

Training in the Vocational Schools, by George A. McGarvey, U. S. Office of Education.

Training in Industry.

a. Problems and Solutions in Training on the West Coast, by F. A. Olmsted, Crown Zellerbach Corporation. (In the absence of Mr. Olmsted his paper was read by a representative of Crown Zellerbach.)

b. Industrial Training at the Union Bag and Paper Corporation Mill in Savannah, by J. H. Groves.

c. The Correspondence Courses of the Pulp and Paper Industry, by J. N. Stephenson, Institute of Industrial Arts.

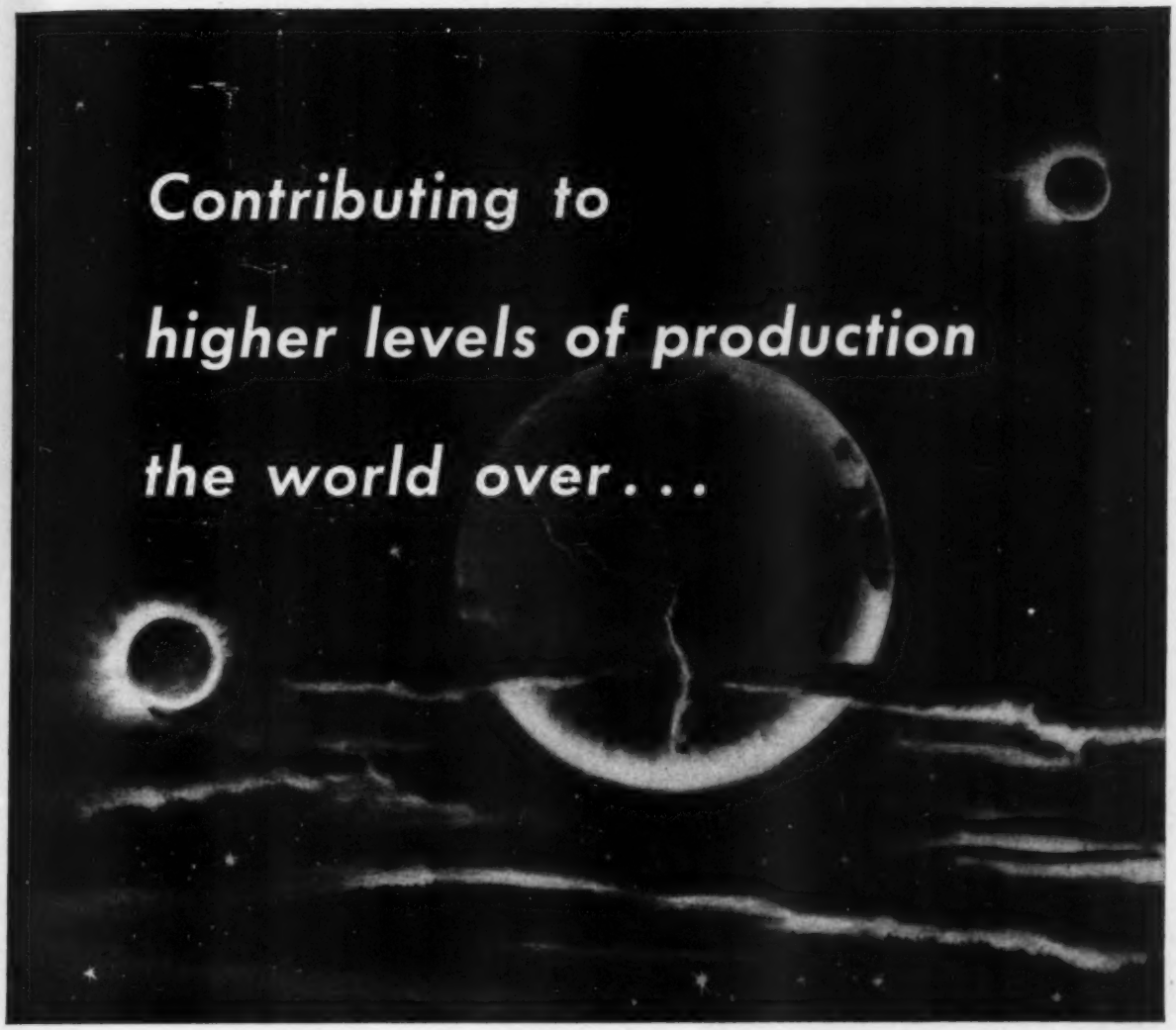
What Industry Expects of Educational Institutions, by Harold M. Annis, Oxford Paper Company (Presented by B. E. Lauer).

Structural Fibrous Materials

With John F. Campbell, Flintkote Company, as chairman, seven papers were presented at this session:

A Comparison of Freeness Testers on Board Stock, by C. E. Hrubesky, Forest Products Laboratory.

Preservative of Fiber Insulating Board with Chlorinated Phenols, by E. A. Behr, Chapman Chemical Company.



CAMACHINE 20, the largest of the mill type Camachines, is a popular pacemaker in high speed paper mill operation. Camachine 20 produces firm, uniformly wound rolls of newsprint, kraft or book paper at speeds up to 4000 fpm, handling webs from 180" to 310".

SWIFT CAMACHINES are singing a song of production in every continent of this world. Side by side with other great products of American engineering skill, Camachines are helping the peoples of all countries to rebuild toward a better life. At home, Camachines are meeting every industrial slitting and roll-winding problem to help boost production to the higher levels which must be achieved in the years ahead. For competent assistance with your roll production problems, consult

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Test Apparatus and Procedure for Determining Resistance to Impact and Concentrated Loads of Structural Insulating Board, by M. H. La Joy and Frank B. Rowley, University of Minnesota.

Evaluation of Fibrous Agricultural Residues for Structural Building Boards—(I.) Methods and Equipment of the Northern Regional Research Laboratory, by E. C. Lathrop and T. R. Naffziger, Northern Regional Research Laboratory.

Evaluation of Fibrous Agricultural Residues for Structural Building Boards—(II.) Fundamental Studies on Wheat Straw Fiber, by E. C. Lathrop and T. R. Naffziger.

Use and Abuse of Fiberboard in Modern Construction, by Griffith S. Clark, Homosote Company.

An Accelerated Method for Measuring the Penetration of Water in Insulating Board, by W. A. Wink and J. A. Van den Akker, Institute of Paper Chemistry.

Coating

A total of seven papers and two discussions were presented in the two meetings of this committee with Frank J. Egan, Consulting Engineer, acting as chairman:

A Study of Penetration of Starch Adhesive in a Coating Mixture Into Base Paper, by J. P. Casey, A. E. Staley Company, and C. E. Libby, New York State College of Forestry.

The Rheological Properties of Clay-Water Suspensions, by Bernard K. Asdell, Edgar Brothers Company.

The Hercules High-Shear Viscometer, by J. Wilson Smith and Paul D. Applegate, Hercules Powder Company.

The Electronic Gloss Indicator as an Aid in the Control of Paper Finish, by Kenneth Bowers, Glens Falls Laboratory, Inc.

The Air Knife Method of Coating, by F. H. Frost, S. D. Warren Company.

Coating Paper on the Paper Machine by the Rotogravure Offset Method, by Gerald Haywood, West Virginia Pulp and Paper Company.

Colloidal Equipment Applied to the Homogenization of Clay and Paper Coatings, by David E. Gould, Eppenbach, Inc.

Discussion—Machinery for Paper Coating—Calendars, by E. E. Thomas, Appleton Machine Company.

Panel Discussion.

Water

Twelve papers were presented in the two meetings of this section with Lewis B. Miller, University of Cincinnati, acting as chairman:

Biological Treatments of De-inking Waste, by Philip Morgan, National Council for Stream Improvement.

The Effects of Chemical Agents on Iron Bacteria, by Karman Duchon, and L. B. Miller, University of Cincinnati.

Federal Legislation on Water Pollution Control, by Arthur D. Weston, Department of Health, Commonwealth of Massachusetts.

Physiological Effects of Sulphate Pulp Mill Wastes on Shellfish, by Walter A. Chipman, Jr., Section of Shellfisheries, U. S. Department of the Interior.

Sludge Contact Reactors in White and Waste Water Treatments, by V. J. Calise, Liquid Conditioning Corporation.

The Application of the Cyclator in Paper Mill White Water Treatment, by J. M. Kahn, Infilco, Inc.

Basic Principles of Corrosion Control by the Use of Lime, by Edward S. Hopkins, Bureau of Water Supply.

A Pennsylvania Waste White Water Treatment Plant, by Rodney F. Coltart, Link-Belt Company.

A Study of Slime Control in a Groundwood Mill, by B. F. Shema, J. B. Anderson, and J. W. Appling, Institute of Paper Chemistry.

Economic Considerations of Feedwater Conditioning, by F. N. Kemmer, Cochrane Corporation.

Process Water for the Manufacture of Groundwood Papers, by J. G. Patrick, West Virginia Pulp and Paper Company.

Quality of Process Water for the Manufacture of Alkaline Pulps (Kraft and Soda), by Lewis B. Miller, Chairman TAPPI Water Committee (by title).

Wet Strength

At this session four papers were presented under the chairmanship of K. M. Britt, Scott Paper Company:

Wet Strength Development with Neutral Water-Soluble Polymers, by R. J. Myers and L. E. Kelley, Resinous Products and Chemical Company.

The Chemistry of Urea and Melamine Resins, by Robert W. Auten, Resinous Products and Chemical Company.

Fundamental Physical Chemical Characteristics of Melamine Resin Acid Colloid, by J. K. Dixon, G. L. M. Christopher, and D. J. Salley, American Cyanamid Company.

The Effects of Salts on the Melamine Resin Wet Strength Paper Process, by C. S. Maxwell and W. F. Reynolds, American Cyanamid Company.

Statistics

Seven papers were presented at this session with T. A. Pascoe, Nekoosa-Edwards Paper Company, acting as chairman:

The Inspection Specifications as a Quality Contract, by J. G. Strieby, Kimberly-Clark Corporation.

Application of Statistical Methods to Paper Testing Procedures—Part I. Folding Endurance, by L. K. Reitz and F. J. Sillay, Eastman Kodak Company.

A Statistical Study of Some of the Variables of Alpha Cellulose Methods, by A. S. O'Brien, R. C. Bloom, and L. K. Reitz, Eastman Kodak Company.

The Control Chart in Sulphite Acid Plant Operations, by W. W. Marteny, Falls Power and Paper Company.

Statistical Quality Control Applied to Paper-Foil Lamination Process, by Arthur C. Dreshfield, Hollabaugh and Dreshfield.

Some Basic Concepts of Statistics and their Applications to Simple Industrial Experimentation, by Maynard S. Renner, Dewey & Almy Chemical Company.

The Error of a Nomagram for the Calculation of Clark Softness, by Geoffrey Beale, R. P. Anderson, and A. A. Harvey, Institute of Paper Chemistry.

Preparation of Papermaking Materials

With P. P. Gooding, Strathmore Paper Company, as chairman, four papers were presented at this session:

Fundamentals of Control Flow Beating, by L. E. Randecker, Hammermill Paper Company.

Rag Mill Hydrafining, by H. P. Espenmiller, Dilts Machine Works.

The Mechanism of Water Resistance, by W. S. Wilson, Monsanto Chemical Company.

Studies of Rosin Sizing—(III.) Composition of Various Size Precipitates, by Donna Price, Hercules Powder Company.

Plastics

The following three papers were presented at this session with E. C. Jahn, New York State College of Forestry, acting as chairman:

The Adhesion Properties of High Polymers, by A. D. McLaren, and C. J. Seiler, Polytechnic Institute of Brooklyn.

Viscosity and Stability of Concentrated Suspensions and Emulsions, by F. R. Eirich, Polytechnic Institute of Brooklyn.

Phenol Furfural Varnishes in Laminants, by Harry Kline, Reichhold Chemicals, Inc.

Mill Instrument Control

Five papers were presented at this session with R. W. Porter, Chemical Engineer, acting as chairman:

Flow Measurement and Control, by W. S. Yunker, Foxboro Company.

Temperature Measurement and Control, by John Chandler, Bristol Company.

Methods of Measuring Liquid Level, by Norman Collin, Taylor Instrument Companies.

Control Valves and Positioners, by John R. Robins, Mason-Neilan Regulator Company.

Continuous Measurement of Sheet Moisture, by Harold A. Scholl, Brown Instrument Company (by title).

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MILL SUPPLY DEALERS DINNER

Transferring its locale from the Commodore Hotel to the Grand Ballroom of the Waldorf-Astoria Hotel in New York, the 40th annual jubilee banquet of the New York Association of Dealers in Paper Mills Supplies, Inc., on the evening of Monday, February 23, was the largest attended and the most successful in the lengthy history of that trade organization. Always an enjoyable event during Paper Manufacturers' Week in New York, the supply dealers' dinner attracted close to one thousand persons, including numerous purchasing agents and other officials of paper, board and roofing mills from all over the country.

Following the serving of a sumptuous dinner, there was an entertaining stage show which kept the huge audience amused until nearly midnight. Walter H. Martens, of George W. Millar & Co., Inc., was, as he has been for many, many years, chairman of the Association's Banquet Committee which arranged the affair, and was assisted by Miss Shirley Rief, Atlantic By-Products Company; Anthony S. Gaccione, Toga Paper Stock Company, Inc.; Harris Goldman, Harris Goldman Company, Inc.; Morris Kay, Wilson Paper Stock Company, Inc.; Louis Marcovitz, Loumar Textile By-Products, Inc., and Arthur Rosenfeld, William Steck & Co., Inc.

Alfred J. Moran, secretary-treasurer of the Association, was chairman of the Journal Committee which produced the customary attractive souvenir journal as a memento of the dinner.

▼

▶▶▶ A SPECIAL MEETING recently of the Paper Mill Men's Club of Southern California, social organization of mill men and representatives, marked the election of new officers. Gerry N. Madigan, of Johnson, Carvell & Murphy, was chosen president; Irvin E. Damon, of Northern Paper Mills, vice president; Jack Leiser, of Pioneer Wrapper Company, secretary; and Roland Wolf of California Cotton Mills Company, treasurer.

Here is the valve that Eliminates these common troubles

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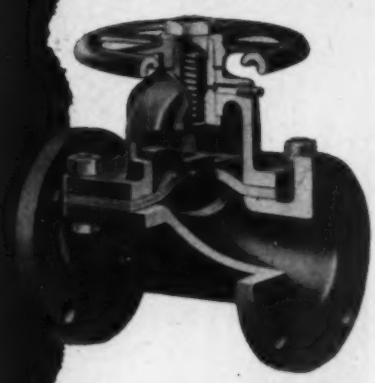
LEAKING
CLOGGING
PACKING REPLACEMENT
STICKING
WIRE DRAWING



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Saunders patent
diaphragm valves

The diaphragm in this unusual valve design serves a double purpose. *First*, it acts as a gasket to isolate bonnet and working parts from the flow, eliminating troublesome stem packing, preventing corrosion of working parts and contamination of materials being handled. *Second*, as the closing medium, it provides a resilient, unfailing, leakproof closure, even when scale or other foreign matter settles on the seat. Maintenance consists only of occasional change of diaphragm. No need to remove valve body from line.

Write for Bulletin V-47 detailing all the benefits of this radically different, proved-in-service valve design. Wide choice of body and diaphragm materials available to meet your requirements. HILLS-McCANNA CO., 2433 W. Nelson St., Chicago 18.

For pressures to 150 Psi. Max. recommended temperatures standard valves 180° F.; others to 220° F. Sizes ¼" to 14" both screwed and flange. Handwheel and lever operated types; air, motor or chain operated.

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Proportioning Pumps
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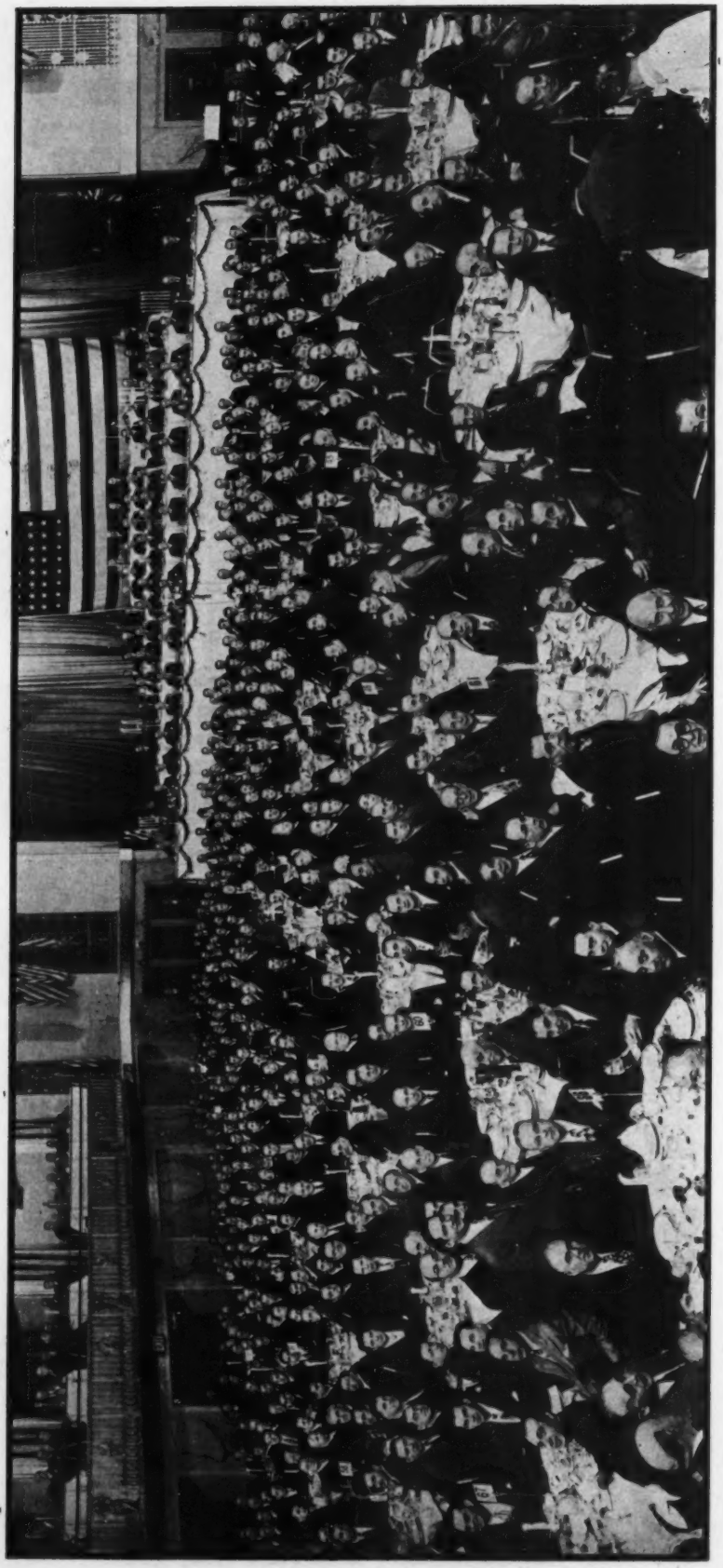
Annual Meeting of Salesmen's Association



The Salesmen's Association Luncheon held at the Waldorf-Astoria on Wednesday of Paper Week drew a record attendance

▶▶▶ THE ANNUAL meeting of the Salesmen's Association of the Paper Industry was held in the West Foyer of the Waldorf-Astoria Hotel, New York City, on the afternoon of February 24. Edward J. Edwards, of the Howard Paper Mills, Dayton, Ohio, who had served the Association as western vice president, was advanced to the presidency, succeeding Edwin F. Miles, of the Crocker-McElwain Company, Holyoke, Mass. Alan B. Helffrich, of the St. Regis Paper Company, New York City, was re-elected eastern vice president, and George M. Watson, of the Mead Sales Company, Inc., New York, assistant eastern vice president, while Daniel H. Keck, of the Kimberly-Clark Corporation, was elected western vice president to succeed Mr. Edwards, and T. Donnell Evans, of the Chicago office of W. C. Hamilton & Co., was elected assistant western vice president.

In the absence of President Miles, who was called home unexpectedly, Mr. Edwards presided at the meeting, and read Mr. Miles' annual report. Reports also were rendered by Mr. Edwards as western vice president, Mr. Helffrich as eastern vice president, and E. G. Amos, secretary-treasurer of the Association. Stanley O. Styles, of the Martine Cantine Company, and a former president of the Association, reported for the membership committee and stated 51 new members had been enrolled during the past year, and that the Association now has a total of 423 members. It was announced that life membership had been awarded to George J. Johnston, formerly of the Champion Paper & Fibre Company, and Paul Bachman, formerly of the Riegel Paper Corporation, both long active in the Association, and both of whom retired from active business during the past year. Announcement also was made by Mr. Edwards that the "President's Award," presented annu-

ally to the member of the Association who has contributed most to the advancement of the Association during the preceding year, had been inscribed to Harold T. Wilson, of the Mead Sales Company, Inc., New York, for his loyal and efficient service on numerous committees and in the varied activities of the Association. Actual presentation of the award to Mr. Wilson will be made at an early meeting of the eastern division, Mr. Edwards said.

Always a social highlight during the yearly convention of the American Paper and Pulp Association, the 29th annual anniversary luncheon of the Salesmen's Association in the Grand Ballroom of the Waldorf-Astoria on Wednesday, February 25, was attended by over 1,200 persons. At the speakers' table were numerous notables in the industry, including President Reuben B. Robertson of the APPA; Cola G. Parker, APPA president-elect; APPA Executive Secretary Earl W. Tinker; W. F. Gillespie, president of the Technical Association; Ralph G. Luff, vice president, and A. H. Chamberlain, executive secretary of the National Paper Trade Association; F. L. Mitchell, general manager, and A. E. Cadman, of the Canadian Pulp and Paper Association; officers of the Salesmen's Association, and Representative Fred A. Hartley, Jr., of New Jersey, co-author of the Taft-Hartley Act and the principal speaker of the occasion. Also at two additional tables on the dais were the chief executives of some forty odd leading paper manufacturing companies from all over the United States.

Congressman Hartley declared that "if both labor and management will give the Taft-Hartley Law a fair trial, we will embark upon the greatest period of prosperity in many a decade." Interrupted frequently by spontaneous outbursts of applause, Mr. Hartley advised labor "to give more for the dollar you earn and you will get more for the dollar you get," rather than adopt a policy of getting as much as possible from as little as possible. To this he added that organized labor can be strong only as long as a free enterprise system is maintained as he expressed the hope that the insurmountable barrier that some people and groups have tried to raise between labor and management would be broken down.

Stressing again and again that production and more production is our greatest need today, he declared that everything should be done to create and preserve industrial peace. He asserted that the Taft-Hartley Law is a step in the right direction as it makes the rules of the game fair to both sides.

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Wherever ships go or steel is erected, the Ingalls name is known. Ingalls all-welded ships set war records, are now in demand for peace. Ingalls barges and storage tanks are as numerous as their uses. Structural steel from Ingalls' four plants strengthens many of the newest and most specialized buildings.

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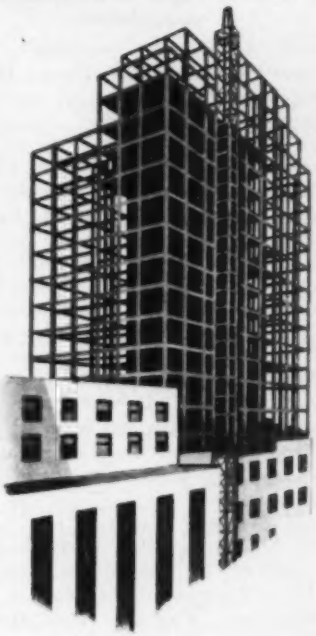

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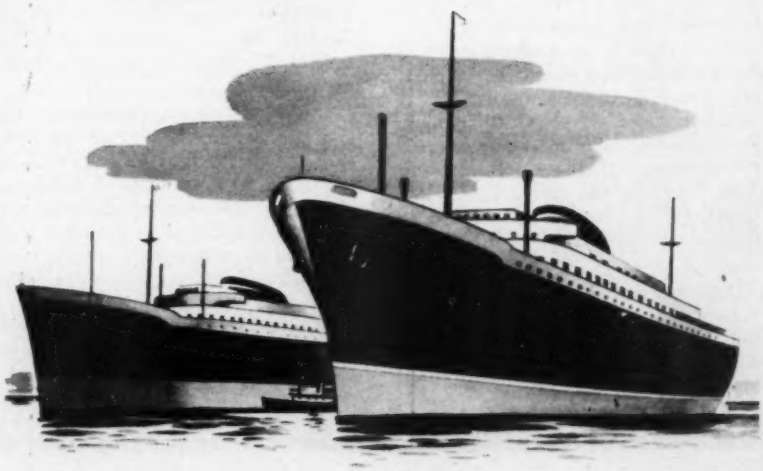

Divisional Groups Meet and Elect

Writing Paper Manufacturers Association

M. D. Bardeen, president of the Lee Paper Company, Vicksburg, Mich., was re-elected president of the Writing Paper Manufacturers' Association at the 87th annual meeting of that organization at the Waldorf-Astoria Hotel, New York, on February 24. Also re-elected for the second year as vice presidents were W. B. Zimmerman, of the Howard Paper Mills, Inc., and H. V. Burgee, of the Parsons Paper Company. Morris C. Dobrow was re-elected executive secretary-treasurer. This marks the beginning of Mr. Dobrow's 33rd year with the Association. John F. Darrow was elected assistant secretary and Miss Olive F. McGill assistant treasurer.

Members re-elected to the Association's Executive Committee representing the Rag Content Group were: H. V. Burgee, Parsons Paper Company; G. H. Gerpheide, Hawthorne Paper Company; A. C. Gilbert, Gilbert Paper Company; Hale Holden, Jr., Byron Weston Company; R. S. Madden, Valley Paper Company; D. E. Oberweiser, Fox River Paper Corporation; E. C. Reid, American Writing Paper Corporation; A. J. Schierl, Whiting-Plover Paper Company, and G. E. Williamson, Strathmore Paper Company.

Members re-elected to the Executive Committee representing the Sulphite Bond Group were: W. B. Zimmerman, The Howard Paper Mills, Inc.; W. J. Garrity, Munising Paper Company; H. H. Hanson, W. C. Hamilton & Sons; W. L. Jennings, West Virginia Pulp & Paper Company; C. B. Morgan, Eastern Corporation; A. C. Remley, Nekoosa-Edwards Paper Company; F. H. Savage, International Paper Company, and R. I. Worrell, Mead Corporation.

The following were also elected to the Executive Committee: R. M. Swaney, Franklin Paper Company, representative of the Bristol Board Group; D. T. Quirk, Peninsular Paper Company, representative of the Cover and Text Paper Group, and Bruce Crane, Crane & Co., Inc., representative of the Thin Paper Group.

H. H. Hanson was elected as the Association's representative on the American Paper and Pulp Association's Board of Governors, with W. B. Zimmerman named as the alternate.

Speakers at the meeting included Richard M. Bissell, Jr., executive secretary of the committee which prepared the Harriman Report on the Marshall Plan and a member of the faculty at MIT; Pierre J. Landry, European observer for the United States Pulp Producers Association; M. D. Bardeen, president of the Association; M. C. Dobrow, executive secretary of the Association, and W. W. Corlett, counsel, and E. G. Amos, secretary of the APPA's Committee on Industrial Relations.

A feature of the meeting was the announcement that three members joined the ranks of the Century Club by virtue of the fact that 1948 marks their 100th year of papermaking. Members who are celebrating their 100th Anniversary this year are the Beckett Paper Company, Hamilton, Ohio; Carew Manufacturing Company, South Hadley Falls, Mass., and the Curtis Paper Company, Newark, Del. Seven other members already have passed the 100-year mark. They are Crane & Co., Inc.; C. H. Dexter & Sons, Inc.; Hurlbut Paper Company; Knowlton Brothers; Smith Paper, Inc.; Southworth Company, and Tileston & Hollingsworth Company.

The meeting was attended by approximately 150 persons.

Cover and Text Paper Group

D. T. Quirk, vice president of the Peninsular Paper Company, Ypsilanti, Mich., was elected chairman of the Cover and Text Paper Group of the Writing Paper Manufacturers Association at its annual meeting at the Waldorf-Astoria on February 25, succeeding R. H. Morrill, of the Chemical Paper Manufacturing Company, Holyoke, Mass. Other members of the Cover and Text Paper Committee elected at the meeting are as follows: M. A. Park, Marvellum Company, vice chairman; R. F. Arnold, Strathmore Paper Company; J. H. Dunton, W. C. Hamilton & Sons, and H. T. Johnson, Mohawk Paper Mills, Inc.

C. W. Boyce, consultant for the U.S. Bureau of the Census and private organizations, and former secretary of the APPA until 1938, addressed the Group. Mr. Boyce observed that the more modern paper machines were designed to manufacture specific types of paper. Therefore, they do not lend themselves efficiently to grade shifting to the same extent that older machines do. He pointed out that a development is occurring in the domestic pulp producing industry which may have far-reaching effects. More pulp is being manufactured by such processes as defibrating or exploding the wood. This development, if expanded, could release substantial digester capacity for the manufacture of additional tonnages of pulp.

M. C. Dobrow, executive secretary of the Writing Paper Manufacturers Association, presented his annual report. "Production of fine papers," Mr. Dobrow said, "was 1,210,000 tons in 1947, 4 per cent higher than in 1946, the previous record year. It was not until the turn of this year that some change in the supply-demand situation became evident. There is now an apparent balance between supply and demand for some, but not most, writing papers. It is possible that increased production will overtake demand for most types of writing papers some time in the latter part of 1948."

Thin Paper Group

The Thin Paper Group of the Writing Paper Manufacturers Association, composed of paper manufacturers who manufacture carbonizing and condenser tissue, cigarette paper and other high grades of thin paper, met in annual session on February 26 at the Waldorf-Astoria. Bruce Crane, of Crane & Co., Inc., Dalton, Mass., was re-elected chairman of the Group.

J. L. Muller, chief of the Forest Products Division, Office of International Trade, U.S. Department of Commerce, informally addressed the Group concerning export controls. Effective March 1, 1948, licenses will be required for the shipment of all commodities, including paper, to Europe. Mr. Muller stressed that while licenses will be required for the exportation of paper, manufacturers would experience a minimum of delay in obtaining action on requests to export. The licensing program of the Department of Commerce was inaugurated to aid the implementation of the Marshall Plan, he stated.

Bristol Board Group

R. M. Swaney, vice president of the Franklin Paper Company, Holyoke, Mass., was elected chairman of the Bristol Board Group of the Writing Paper Manufacturers Association at the annual meeting at the Waldorf-Astoria on February 23. Mr. Swaney succeeds Kendall Wyman, of the Champion Paper & Fibre Company, who retired as chairman. Other members of the Group's Executive Committee elected were J. B. Cowie, Hollingsworth & Whitney Company, vice chairman; Norman Harrower, Linton

How to simplify piping jobs in Pulp and Paper Mills

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

Get everything for the job from Crane . . . it's as easy as that! From the first step of a piping layout, in writing specifications, through erection and maintenance, relying on the complete Crane line for all materials saves time and trouble. All piping procedures go smoother and faster—from start to finish.

Note this high-pressure pump hookup to a hydraulic barker system, for instance. See how its performance can be protected by Crane Quality in every piping item. And how the entire installation can be simplified by this 3-way advantage of standardizing on Crane materials:

ONE SOURCE OF SUPPLY gives you the world's most complete selection of valves, fittings, pipe, accessories, and fabricated piping for all power, process, and general service applications. One order covers everything for the job.

ONE RESPONSIBILITY for piping materials helps you to get the best installation and to avoid needless delays.

OUTSTANDING QUALITY in every item assures dependable performance in every part of piping systems.

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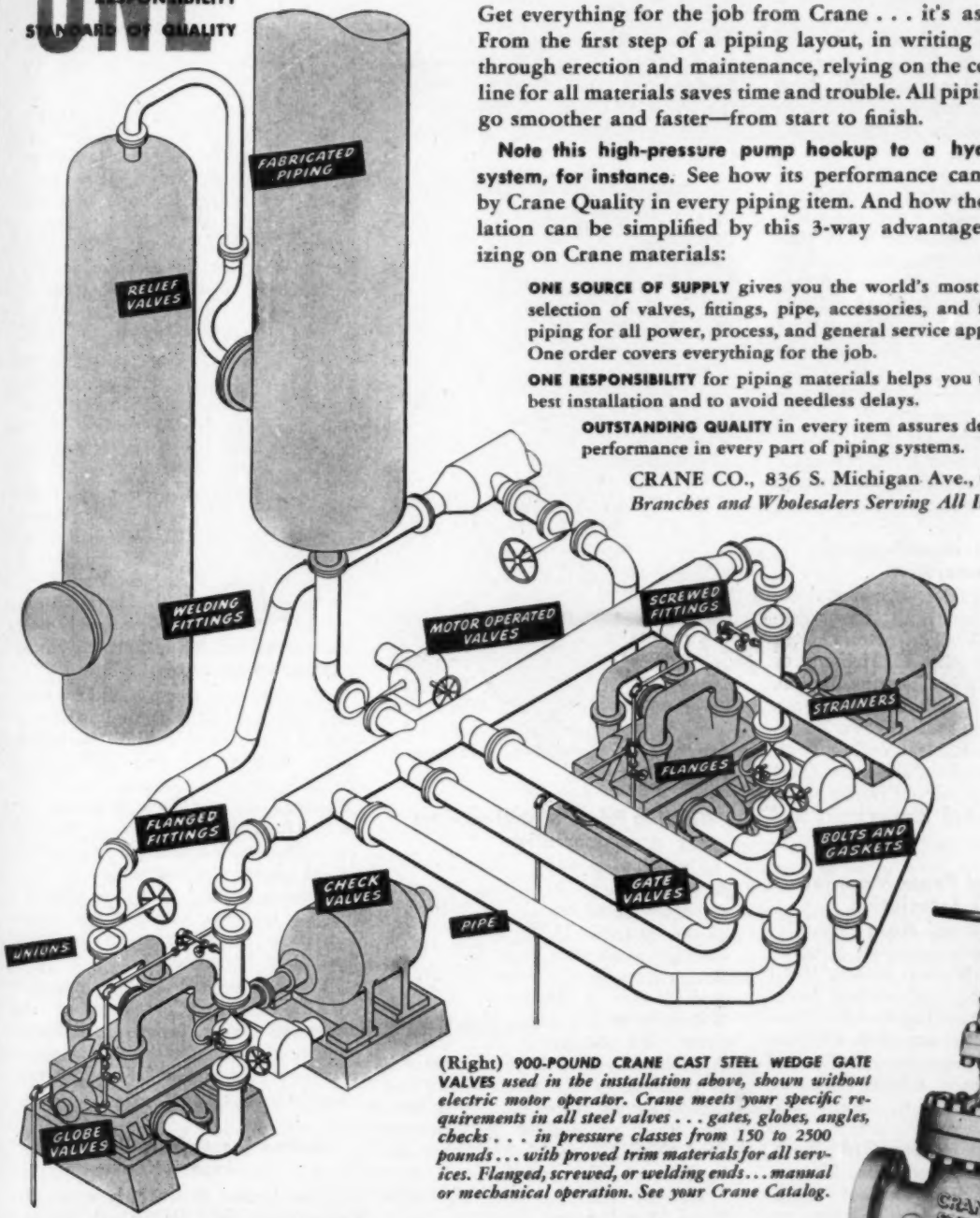
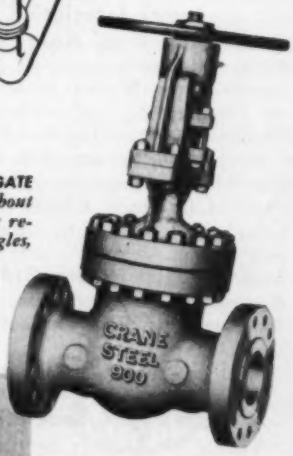


Piping hookup to pumps and accumulators in a high-pressure hydraulic barker system.



(Right) **900-POUND CRANE CAST STEEL WEDGE GATE VALVES** *used in the installation above, shown without electric motor operator. Crane meets your specific requirements in all steel valves . . . gates, globes, angles, checks . . . in pressure classes from 150 to 2500 pounds . . . with proved trim materials for all services. Flanged, screwed, or welding ends . . . manual or mechanical operation. See your Crane Catalog.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM

Brothers, Inc.; H. A. Stone, Jr., Riegel Paper Corporation, and Kendall Wyman, Champion Paper & Fibre Company.

A motion picture "The Place of Bristol in Advertising Printing" was a feature at the meeting. The film is the property of Linton Brothers, Inc., Fitchburg, Mass.

John B. MacAfee, secretary of the Forest Industries Information Committee, spoke at the meeting, describing the Committee's purpose. "The Forest Industries Information Committee," said Mr. MacAfee, "is the medium by which the lumber, pulpwood, pulp and paper industries inform the public of the facts concerning these industries. Its activities are centered in 33 state committees throughout the country."

M. C. Dobrow, executive secretary of the Association, reviewed business conditions during 1947 and the expectations for 1948. "The inflationary boom has cracked," Mr. Dobrow said, "and the tumble in agricultural prices signifies a real change in the post-war inflationary trend. This is not the case of 'hard' times coming, but perhaps it should be characterized as one in which 'soft' times are going out."

Newsprint Manufacturers Association

The Newsprint Manufacturers Association held its annual meeting on February 24 at the Waldorf-Astoria Hotel, and re-elected John L. Hobson, of the St. Croix Paper Company, Boston, Mass., president for the ensuing year. J. D. Zellerbach, of the Crown Zellerbach Corporation, New York, was re-elected vice president, and John Zima, of the Newsprint Service Bureau, New York, was elected the secretary and treasurer.

Groundwood Paper Manufacturers Association

The Groundwood Paper Manufacturers Association convened in yearly session at the Waldorf-Astoria Hotel on February 24, and elected James Conley, of Fraser Paper, Ltd., New York, president to succeed R. O. Warner, of the Minnesota and Ontario Paper Company. Edward Doonan, Gould Paper Company, Lyons Falls, N.Y., was elected eastern vice president, and Lawrence Stedman, Kimberly-Clark Corporation, Neenah, Wis., western vice president. R. E. Canfield, of New York, was re-elected executive vice president.

Kraft Paper Association

Harold O. Nichols, of the Crown Zellerbach Corporation, was elected president of the Kraft Paper Association, Inc., at the annual meeting of that organization held on February 26 at the Waldorf-Astoria. Mr. Nichols, who had served the Association as vice president, succeeds George Stuhr, of the Southern Kraft Division of the International Paper Company. G. F. Henderson, of the Brown Company, was elected vice president to succeed Mr. Nichols.

The following were also named to the Association's Executive Committee for 1948-1949: W. M. Allin, Southern Advance Bag and Paper Company; J. B. Cowie, Hollingsworth & Whitney Company; H. S. Daniels, Union Bag and Paper Corporation; J. R. Diggs, Mosinee Paper Mills Company; W. J. Dixon, St. Regis Paper Company; D. G. Driscoll, Sorg Paper Company; K. O. Elderkin, Crossett Paper Mills; L. W. Gould, Gaylord Container Corporation; T. V. Heffernan, Gilman Paper Company; William Mazer, Hudson Pulp and Paper Company; S. M. Phelan, Jr., West Virginia Pulp and Paper Company; W. C. Shorter, Camp Manufacturing Company, and George Stuhr, Southern Kraft Division of the International Paper Company.

The Tissue Association, Inc.

At a largely attended annual meeting at the Waldorf-Astoria Hotel on February 25 in the Jade Room of the Hotel, The Tissue Association, Inc., re-elected E. E. Grant, president of The Crystal Tisue Compasny, Middletown, Ohio, president for the ensuing year. A. B. Hanson, of the Northern Paper Mills, Green Bay, Wis., was re-elected vice president, and Ross A. Fife, of New York, was again named executive secretary.

Blotting Paper Manufacturers Association

The Blotting Paper Manufacturers Association held its annual meeting at the Waldorf-Astoria on February 24 and elected L. D. Nicholson, of the District of Columbia Paper Mills, Inc., Washington, D. C., president to succeed Joseph J. Hallowell, of the Wrenn Paper Company, Middletown, Ohio. Mr. Nicholson is a son of G. L. Nicholson, who recently retired as president of his company and became chairman of the board, after having served as head of the company since 1900. His son, L. D. Nicholson, has been with the company since 1919.

Douglas Fleet, of the Albemarle Paper Manufacturing Company, Richmond, Va., was elected vice president of the Association, and Eric Lagerloef was elected secretary-treasurer. Mr. Lagerloef succeeds W. D. Staples, who recently resigned from the APPA staff to go with the public relations division of the West Virginia Pulp and Paper Company, New York.

Sulphite Paper Manufacturers Association

George Stuhr, of the Southern Kraft Division of the International Paper Company, New York, was elected general chairman of the Sulphite Paper Manufacturers Association at the annual meeting of that organization on February 23 at the Waldorf-Astoria Hotel. Vice chairmen elected were Donald F. McCall, Racquette River Paper Company, Potsdam, N.Y., for the Unbleached Group; Jack B. Cowie, Hollingsworth & Whitney Company, Boston, Mass., for the Manila Group; James G. Conley, Fraser Paper, Ltd., New York City, for the Bleached Group; Neil E. Nash, Nekoosa-Edwards Paper Company, Port Edwards, Wis., for the Machine Glazed Paper Group, and Gilford E. Henderson, Brown Company, Berlin, N.H., for the Bleached Converting Group.

The Board of Governors elected consists of Wayne A. Brown, Crown Zellerbach Corporation, San Francisco, Calif.; A. Southon, Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich.; Leo E. Croy, Marathon Corporation, Menasha, Wis.; Alan G. Hendry, Consolidated Water Power & Paper Company, Wisconsin Rapids, Wis., and Rufus I. Worrell, Mead Sales Company, Inc., New York City. E. W. Kiefer, of the Port Huron Sulphite & Paper Company, Port Huron, Mich., was elected ex-officio member chairman of the Board.

A deflationary trend caused by Federal retirement of wartime inflationary media is the cause behind the recent price decline and this deflationary trend is likely to continue, Col. E. C. Harwood, director of the American Institute for Economic Research, asserted in addressing the meeting. Col. Harwood advised extreme caution in making business and financial commitments "until the extent of the deflation now in progress can be more accurately determined."

Major Warren B. Bullock, manager of the Import Committee of the American Paper Industry, addressed the meeting also, outlining the latest developments in the field of international trade in paper.

United States Pulp Producers Association

The United States Pulp Producers Association held its annual meeting on February 23 at the Waldorf-Astoria Hotel, preceded by a meeting of the Executive Board and the Association's annual luncheon, and elected the following regional directors to the Executive Board for 1948: New England — Downing P. Brown, Brown Company; Middle Atlantic—Norman

Announcing NOPCO KFH

A NEW VERSION OF NOPCO KF

specifically designed for Hardwater Areas

Where does your mill fit into this picture? If it is located in any of the hard or moderately hard water areas shown on this map, then NOPCO KFH — new *hard-water* version of NOPCO KF — can definitely help you to solve some of the tougher problems of paper production. From Nopco KFH you'll get the same unsurpassed foam-killing effectiveness that has long distinguished Nopco KF in paper mills throughout the world. As an *important plus,* you'll also find Nopco KFH *more readily dispersible,* resulting in easier, speedier preparation of stock emulsions.

The same quick action, dependability and economy. Like NOPCO KF, NOPCO KFH needs but minutes to drive foam from the head-box, clear bubbles from the wire. Like KF, KFH improves sheet formation even at increased machine speeds, with better than 75% elimination of thin spots. What's more, Nopco KFH is proving as effective as Nopco KF in providing these advantages to mills in *soft-water* areas. For this reason—and because of its *greater ease of handling*—mill operators in soft-water regions will find Nopco KFH well worth investigating.

NOPCO KFH, in short, is another outstanding product added to an already versatile and successful line of NOPCO products — all acknowledged leaders in their field. NOPCO KFH is a further example of Nopco's continuing program of research, whose aim is to provide the Paper Industry with the most advanced developments in processing chemicals.

See what this *new chemical substance* — expressly formulated to aid sheet formation and eliminate foam in hard-water areas — can do in *your* mill. Why not include a barrel or two of NOPCO KFH in your next order for regular NOPCO KF?

NOPCO CHEMICAL COMPANY, Harrison, N. J.

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Branches: Boston • Chicago • Cedartown, Ga. • Richmond, Calif.

FOR KF PERFORMANCE IN HARD WATER

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NOPCO KFH

NOPCO — EVOLVED THRU RESEARCH

An Affiliate of the American Pulp and Paper Mill Superintendents Association

W. Wilson, Hammermill Paper Company; South — David Graham, West Virginia Pulp and Paper Company; Lake States—W. M. Wright, Kimberly-Clark Corporation, and West Coast —L. K. Larson, Pulp Division of the Weyerhaeuser Timber Company.

Directors at large elected were: Alexander Calder, Union Bag and Paper Corporation; Willard J. Dixon, St. Regis Paper Company; Amor Hollingsworth, Penobscot Chemical Fibre Company; John E. Hyde, S. D. Warren Company; Stuart E. Kay, International Paper Company; W. S. Lucey, Rayonier Incorporated; James L. Madden, Hollingsworth and Whitney Company; John Stevens, Jr., Marathon Corporation; Lawson Turcotte, Puget Sound Pulp and Timber Company, and Rufus I. Worrell, Mead Sales Company, Inc.

Oliver M. Porter, of New York City, was again named executive director of the Association.

Coated and Processed Paper Association

William B. Snow, of the Middlesex Products Corporation, Cambridge, Mass., was re-elected president of the Coated and Processed Paper Association at the yearly meeting of that organization at the Waldorf-Astoria on February 24. Dr. Werner Kaufmann, of Kupfer Brothers Company, New York City, and Charles H. Hoffman, of Hughes & Hoffman, New York City, were elected vice presidents. These officers together with Robert C. Adams, Marvellum Company; Bernard B. Novarel, Lachman-Novarel Paper Corporation; Spurgeon F. Barndt, Wyomissing Glazed Paper Company, and Ralph H. Lane, Bradner-Smith & Co., will compose the Association's Executive Committee for the coming year. Arthur A. Thomas, of New York City, was again named executive director and secretary-treasurer.

Glassine and Greaseproof Manufacturers Association

The annual meeting of the Glassine and Greaseproof Manufacturers Association was held on February 25 at the Waldorf-Astoria Hotel, with a large number of the membership present. The Association elected Paul E. Hodgdon, of the Deerfield Glassine Company, Monroe Bridge, Mass., president, and Folke Becker, Rhinelander Paper Company, Rhinelander, Wis., as representative on the APPA Board of Governors. Members of the Executive Committee elected were Arthur Schwab, Hammersley Manufacturing Company, Garfield, N.J.; John L. Riegel, Riegel Paper Corporation, New York City; Folke Becker, Rhinelander Paper Company, Rhinelander, Wis., and Paul F. Moore, Westfield Paper Company, Russell, Mass. Thomas J. Burke, of New York City, was renamed Association Secretary.

Soda Pulp Manufacturers Association

Peter A. Paine, of the New York and Pennsylvania Company, New York City, was elected chairman for the ensuing year by members of the Soda Pulp Manufacturers Association in annual meeting February 25 at the Waldorf-Astoria. Amor Hollingsworth, Penobscot Chemical Fibre Company, Great Works, Me., was elected vice chairman, and R. I. Worrell, Mead Sales Company, Inc., New York City, secretary and treasurer.

Association of Pulp Consumers

The seventh annual meeting of the Association of Pulp Consumers, Inc., was held at the Waldorf-Astoria Hotel on February 26. The principal speaker was Major Harold L. Hamilton, U. S. Army, formerly chief of the Pulp and Paper Section of the Office of Military Government in Germany, who gave an interesting off-the-record talk on the German pulp and paper industry.

Hugo H. Hanson, president of the Association, reviewed the new program of the Association which had been put into effect during the year. He expressed satisfaction with the progress which had been made and emphasized the need for continued cooperation of the members in carrying forward this program.

Karl A. Clauson, secretary of the Association, stressed in his report the need for co-operation between the consumers and producers of market wood pulp. He stated that with a membership totaling 178 corporations operating 286 paper mills, the Association represented the nonintegrated portion of the industry which is vitally dependent on the availability of market pulp. Discussing the wood pulp supply picture, he pointed out that 44 per cent of the available market pulp during 1947 came from domestic production, 29 per cent from Canada, and 27 per cent from Scandinavia. Inventories of market pulp were 50 per cent higher at the beginning of 1948 than they were a year previously. Reviewing the future pulp supply picture, Mr. Clauson outlined the current Scandinavian developments which he observed during his recent visit to Europe. He also gave a resume of the domestic and Canadian outlook and the possibilities of an Alaskan pulp development.

Five directors were elected to serve the Association for the next three years, as follows: G. E. O'Connor, president of the Mohawk Paper Mills, Cohoes, N.Y.; A. F. Owen, general manager of the Latex Fiber Industries Company, Inc., Beaver Falls, N.Y.; B. I. Reider, president of the Victoria Paper Mills Company, Fulton, N.Y.; S. B. Sutphin, president of the Beveridge Paper Company, Indianapolis, Ind., and R. L. Vayo, manager of the pulp department of the St. Regis Paper Company, New York City.

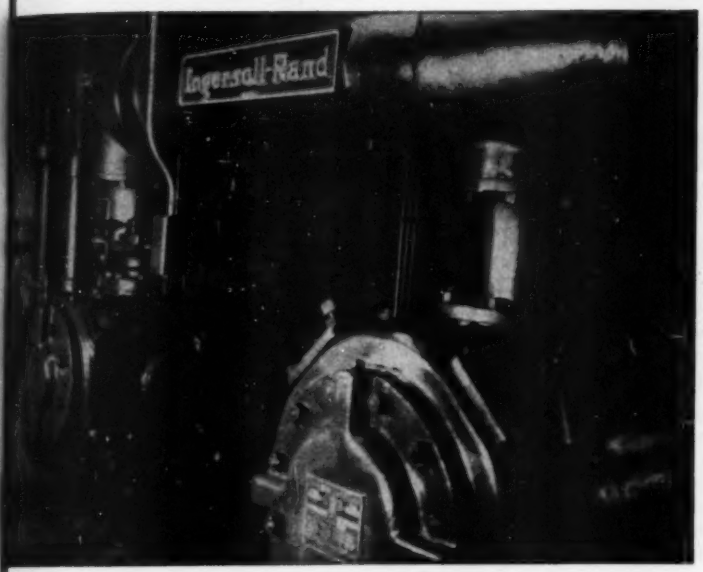
These five will serve with the following ten directors whose terms continue: William Beckett, The Beckett Paper Company, Hamilton, Ohio; F. G. Bemis, Bemis Bro. Bag Company, Peoria, Ill.; E. E. Grant, Crystal Tissue Company, Middletown, Ohio; Hugo H. Hanson, W. C. Hamilton & Sons, Miquon, Pa.; Hale Holden, Jr., Byron Weston Company, Dalton, Mass.; Dwight G. W. Hollister, A. P. W. Products Company, Inc., Albany, N.Y.; Joseph S. Miller, New Haven Pulp and Board Company, New Haven, Conn.; A. K. Nicholson, Hollingsworth and Vose Company, East Walpole, Mass.; Harry C. Sackett, Alton Box Board Company, Alton, Ill., and N. H. Sandberg, Waldorf Paper Products Company, St. Paul, Minn.

National Council for Stream Improvement

A record attendance of over 150 industry and State and other regulatory agency representatives at the annual meeting of the National Council for Stream Improvement on the morning of February 25 at the Waldorf-Astoria Hotel heard addresses by national figures in the stream sanitation and regulatory agency fields. Speakers included Arthur D. Weston, chief sanitary engineer of the Massachusetts Department of Public Health, who spoke on the "Viewpoint of a New England State Regulatory Agency on Water Pollution by Municipal and Industrial Wastes" and Dr. Rolf Eliassen, professor of sanitary engineering of New York University, who discussed the "Relationship of the Equities Involved in Surface Water Usage."

George E. Dyke, president of the Robert Gair Company, Inc., and chairman of the Council's Board of Governors, presided at the business meeting of the Council, and Clyde Morgan, president of the Eastern Corporation and vice chairman of the Council's Board of Governors, presided at the open meeting. Mr. Dyke, in summarizing the Council's activities in 1947, stressed the rapid progress the Council is making in its research program. Also notable, Mr. Dyke stated, was the valuable contribution to the

Compressor Problems Solved with . . . . . STANOIL



Ends gum troubles . . .

When a midwest toy manufacturer installed a new Ingersoll-Rand compressor, troubles arising from gum deposits prompted him to shift from a conventional lubricant to Stanoil, a highly stable, multi-purpose oil with an oxidation inhibitor.

Gum troubles stopped. Now, after 2½ years service with Stanoil, air cylinders and valves are free of deposits—"amazingly clean," according to the operating engineer.

5 years—no shutdowns for cleaning . . .

Until 5 years ago, excessive deposits on compressor discharge valves caused trouble no end for a midwest lumber company. A new intake filter failed to stop deposit formation. Although nearly convinced that downtime for cleaning could not be avoided, the operator was persuaded to try Stanoil.

Since that time, the compressor has never needed to be shut down for cleaning. The heat-resistant qualities and low carbon-forming tendency of Stanoil keep valves free from troublesome deposits.

11 years—with low maintenance . . .

In the past, valve deposits had to be cleaned frequently from a Chicago Pneumatic Air Compressor using conventional oil in a midwest pump-manufacturing plant. In addition to increasing maintenance cost, these deposits reduced compressor efficiency. At the suggestion of a Standard Oil Engineer, Stanoil was tried.

Result: eleven years of trouble-free operation, no carbon deposits, no bearing trouble. Stanoil has established an enviable record for low maintenance in this compressor.

You can get help on compressor-maintenance problems . . .

A Standard Oil Lubrication Engineer will be glad to help you test Stanoil in your compressors. He also can point out other equipment in your plant where the high stability and clean operation of this multi-purpose oil can save money and maintenance time. Write Standard Oil Company (Ind.), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

industry embodied in the Council's direct mill service program. Organized in 1943, with the accent largely on research, industry support had enabled the Council not only to carry on and expand its research activities, but also to expand its activities to the point where it could be considered not only a research but a service organization as well.

The Council re-elected Mr. Dyke chairman for the coming year, and elected Clyde B. Morgan and J. D. Zellerbach vice chairmen; John D. Zink treasurer, and Russell L. Winget executive secretary and assistant treasurer. The Board of Governors of the Council consists of the following executives of United States pulp, paper and paperboard companies: D. K. Brown, Alexander Calder, Hugh J. Chisholm, George E. Dyke, D. C. Everest, R. G. Fairburn, R. K. Ferguson, Sydney Ferguson, Sydney Frohman, P. H. Glatfelter, R. A. Hayward, J. H. Hinman, J. L. Hobson, G. W. Mabee, Clyde B. Morgan, H. W. Morgan, Reuben Robertson, Sr., Dwight L. Stocker, Lawson P. Turcotte, M. W. Swaim, George R. Wallace and J. D. Zellerbach.

Paper Napkin Association, Inc.

The Paper Napkin Association, Inc., convening in annual session on February 24 at the Hotel Barclay, New York, adopted an industry-wide sales promotional campaign which had been prepared by Howard Monk and Associates, of Rockford, Ill. Presentation of the plan was made by Mr. Monk, who has been conducting this kind of work for the waxed paper industry for several years. The following Executive Committee was elected for 1948 as the governing body of the Association; A. W. Stompe, Marathon Paper Mills Company; W. F. Erisman, Erving Paper Mills; J. F. Meyer, Graff Paper Company; Elmer R. Krueger, Paper Products Company; B. B. Reed, C. A. Reed Company; George Schildge, Rushmore Paper Mills; Samuel Lopin, Hudson Pulp and Paper Corporation, and F. R. Graham, Graham Manufacturing Company.

Waxed Paper Institute, Inc.

At the annual meeting of the Waxed Paper Institute, Inc., on February 25 at the Waldorf-Astoria Hotel, W. P. Patterson, of the Specialty Paper Company, Dayton, Ohio, was elected chairman, and C. C. Sherman, of the H. P. Smith Paper Company, Chicago, Ill., vice chairman. These officers and the following compose the Executive Committee for 1948: George C. Wieman, Western Waxed Paper Company, Los Angeles, Calif.; Paul M. Beach, Riegel Paper Corporation, New York City; Edgar L. Berkley, Waxide Paper Company, Kansas City, Mo.; J. E. Edelstein, Rapinwax Paper Company, Minneapolis, Minn.; Louis Kimple, Dixie Wax Paper Company, Dallas, Tex., and H. K. Snyder, Central Waxed Paper Company, Chicago, Ill.

The meeting was addressed by Commissioner Lowell B. Mason of the Federal Trade Commission, and W. S. Bondy, consulting engineer.

United States Paper Exporters Council, Inc.

At a meeting held on February 26 at the Uptown Club in New York, Harry Bengtsson, president of the Benex Corporation, of New York City, was elected president of the United States Paper Exporters Council, Inc., for the ensuing year.

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▶▶▶ AT THE MEETING of the American Society of Mechanical Engineers held in New Orleans on March 4, R. K. Allen, engineer of The Babcock and Wilcox Company, presented a paper describing recent developments in the recovery of chemicals from residual liquor, and in the generation of power and process steam.

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▶▶▶ JOINT MEETINGS of the Technical Committee and the Standards and Practices Committee of the Packaging Institute have been called during the Packaging Conference and Exposition to take place at the Hotel Cleveland, Cleveland, Ohio, on April 28.

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▶▶▶ THE NEWLY FORMED Michigan Division of the Industrial Packaging Engineers Association held its first formal meeting recently at the Sheraton Hotel in Detroit, with fifty members in attendance. The new president, Harry G. Diefendorf, of Wayne University, presided.

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FIRST SHOWING OF MANY ITEMS OF HEATING AND VENTILATING EXPOSITION

A total registration of 39,172 proved a heavy attendance at the 8th International Heating and Ventilating Exposition, under the auspices of the American Society of Heating and Ventilating Engineers, which held its 54th annual meeting during the same period, February 2-6 in Grand Central Palace, New York City. The general public was not admitted.

Reflecting the rapid pace at which the heating and ventilating industry is moving, a surprisingly large proportion of items were exhibited at the exposition for the first time. Of interest was the notable advance in numbers of manufacturers who have broadened their lines to meet all phases of the industry's requirements; also the continuing advance in the use of new structural materials of all kinds; and further emphasis on certain types of heat radiation.

Further pace-making is forecast by the announcement that the 9th International Heating and Ventilating Exposition will be held January 24-28, 1949, in Chicago.

Charles F. Roth, president of International Exposition Company, was manager of the show, and Earl K. Stevens, associate manager.

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▶▶▶ THE ANNUAL PLASTICS competition is being revived by *Modern Plastics* for the first time since 1941. Entries to the Seventh Modern Plastics Competition are welcome from all concerns and individuals who have had any part in creating or producing a plastic product or component or new application which has been in production and marketed since August 31, 1945. Entries will be accepted until May 15, 1948. Winners will be announced in the September issue of *Modern Plastics*.

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COMING EVENTS

May 19-21—Annual meeting of the American Pulp and Paper Mill Superintendents Association at the Roosevelt Hotel, New Orleans, La.

Aug. 25-27—TAPPI (National) fall meeting, Fundamental Research Committee, Madison, Wis.

Sept. 4-6—Meeting of Technical Section, Canadian Pulp & Paper Association, Harrison Hot Springs, B. C.

Sept. 13-17—Third Instrument Conference and Exhibit, Philadelphia Convention Hall, Philadelphia, Pa.

Sept. 27-29—TAPPI (National) fall meeting, Mechanical Pulping Committee, Poland Springs, Me.

Oct. 11-13—TAPPI (National) fall meeting, Testing Division, Pittsburgh, Pa.

Oct. 12-16—Fifth National Chemical Exposition by the Chicago Section of the American Chemical Society, Chicago Coliseum, Chicago, Ill.

Oct. 18-22—Thirty-sixth Annual Safety Congress, Chicago, Ill.

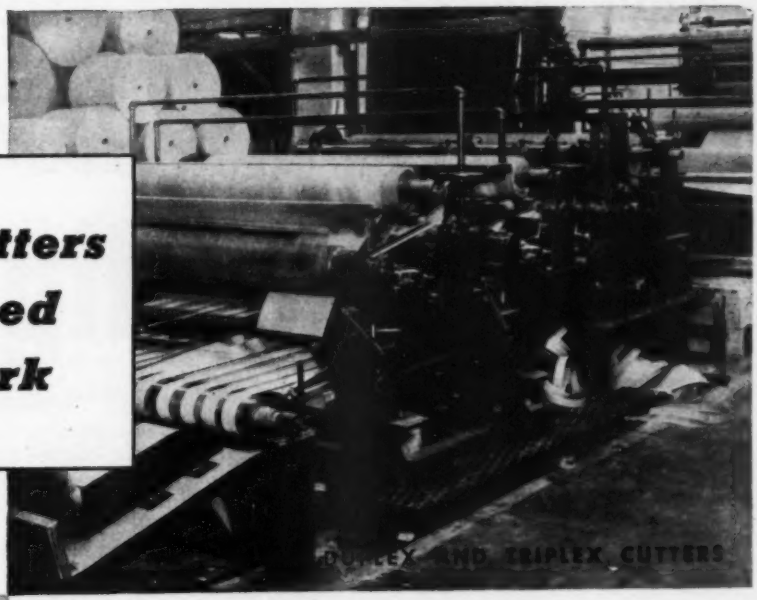
Oct. 25-28—TAPPI (National) fall meeting, Third Engineering Conference, Buffalo, N. Y.

Oct. 28-30—Meeting of National Paper Trade Association, Hotel Stevens, Chicago, Ill.

STATED MEETINGS

Chicago Professional Paper Group meets the third Monday of each month at the Chicago Bar Association, Chicago, Ill. (except July and August).

Extra sturdy cutters for High-Speed Precision Work



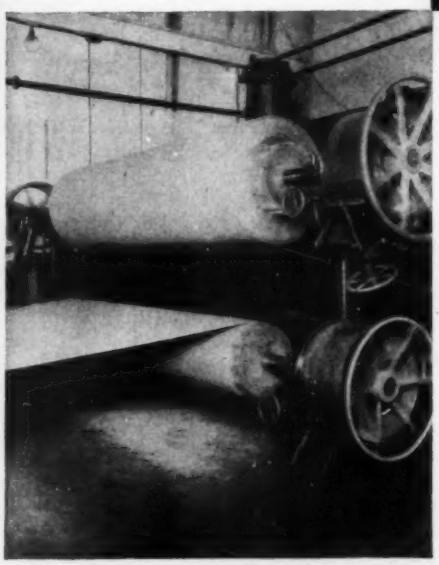
Heavy-duty equipment for cutting to length with extreme accuracy at high speeds.

Sturdy, box type frames. Anti-friction bearings on draw and top pinch rolls. Rotating knives driven by V-Belt and equipped with A. F. bearings. Complete with speed changers and duplex slitter. Available in any size.

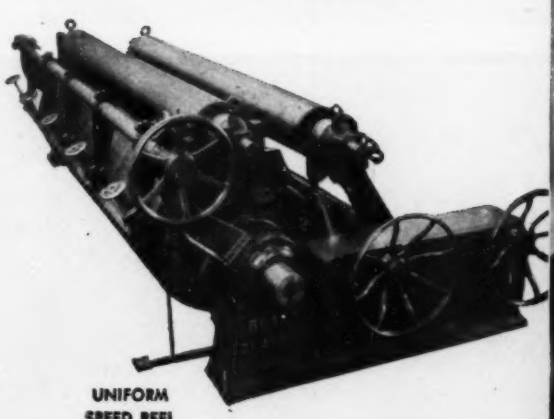
Also calenders, reels, slitters, winders

THE BLACK-CLAWSON CO., Hamilton, Ohio

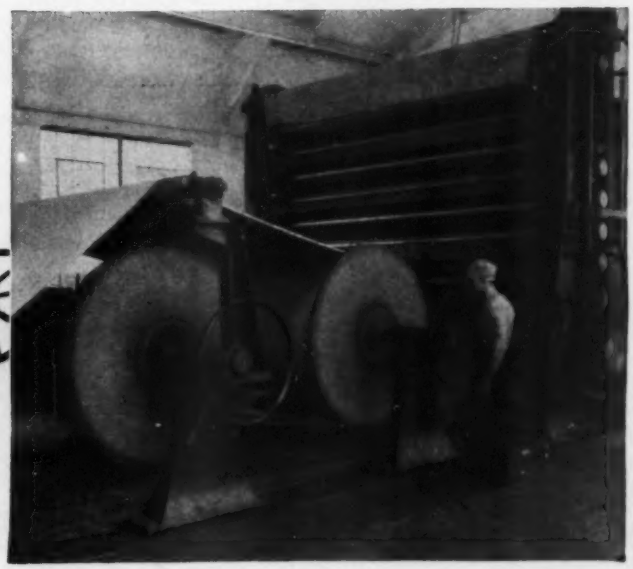
Divisions: SHARTLE BROS. MACHINE COMPANY, MIDDLETOWN, OHIO
DILTS MACHINE WORKS, FULTON, NEW YORK
Foreign: THE BLACK-CLAWSON CO. (ENGLAND) LTD., MORDEN, ENGLAND
Associate: Alexander Flack Limited, Ottawa, Canada



UPRIGHT REEL



UNIFORM SPEED REEL



DOUBLE STAND REEL

C. K. WILLIAMS & CO. AND EIGHT SUBSIDIARIES CONSOLIDATE OPERATIONS

To serve the trade more effectively, C. K. Williams and Co. and eight of its subsidiaries have been consolidated, effective March 1, 1948.

The constituent companies, under the new corporate name of C. K. Williams & Co., are Geo. S. Mepham Corporation, East St. Louis, Illinois; Blue Ridge Oxide Company, Lehigh Gap, Pennsylvania; Calcium Chemical Corporation, Adams, Massachusetts; Point Milling & Manufacturing Company, East St. Louis, Illinois; Seminole Pigment Company, Warren, Ohio; The Sulphiro Company, Inc., Martins Ferry, Ohio; Synthetic Iron Color Company, Richmond, California; C. K. Williams & Co. of California, Ltd., Emeryville, California, and C. K. Williams and Co., Easton, Pennsylvania. Executive offices are located at the East St. Louis, Illinois, plant.

Officers of the new corporation are men who have been associated with these companies for periods ranging from nineteen to thirty-five years. They are M. R. Williams, chairman of the board and treasurer; L. K. Ayers, president; J. W. Ayers, R. W. Dodson, Verne Frazee, J. W. Schlosser, and T. K. Stinson, vice presidents, and E. G. Davies, secretary.

Offices will remain at the several plant locations (Easton, East St. Louis, Emeryville, and Warren). Additional sales offices are located in Atlanta, Chicago, Detroit, Montreal, Boston, Cincinnati, Los Angeles, New Orleans, Toronto, Brooklyn, Cleveland, Milwaukee, and St. Paul.

Sales personnel remains unchanged, and continues to be directed by present division managers, as follows: John Sellon, Easton; W. D. Nichols, East St. Louis; John S. Googins, Emeryville. The co-ordinating of sales to concerns operating nationally is covered by W. N. Crumpler.

▼

42ND ANNUAL BANQUET HELD BY PIONEER CLUB OF E. C. ATKINS & CO.

The Pioneer Club of E. C. Atkins and Company, Indianapolis, held its 42nd annual banquet on February 21, at the Severin Hotel. Four hundred members attended the meeting of the club, which has been in existence since 1906.

Elias C. Atkins, the company president and honorary president of the club, was the principal speaker and welcomed the new members. Recently the club met and members were presented with their first twenty year service pins and the other members received exchange pins for each additional five-years membership.

Especially honored at the banquet were the nineteen members of the 50-Year Club, both active and inactive, whose services range from fifty to sixty-six years.

▼

▶▶▶ RECENTLY APPOINTED distributor of a new potato starch plant is American Key Products of New York. Owned by the Idaho Potato Growers, Inc., Idaho Falls, Idaho, the plant has a productive capacity of about 20 tons of starch per day, but due to lack of raw materials, no regular operation will be possible during the remainder of the present season. The same producer also operates a large dehydration unit at Idaho Falls.

▼

▶▶▶ CONSOLIDATION has been announced by Morningstar, Nicol, Inc., New York, of its industrial adhesive manufacturing subsidiaries, Paisley Products, Inc. of Illinois, and Paisley Products, Inc. of New York. Murray Stempel, formerly general manager of the Chicago company, has been elected vice president and general manager of the combined companies. Earl C. Lenz, formerly sales and service manager of the Chicago plant, has been promoted to general sales manager and will also continue to direct advertising and sales promotional activities. L. J. LaBrie, former technical director, has assumed the position of sales manager of the New York plant.

▼

MONSANTO FINDS SITE FOR ATOMIC ENERGY RESEARCH

Monsanto Chemical Company has announced the selection of a site northeast of Marion, Ohio, for the establishment of a new atomic energy installation, to be part of the Atomic Energy Commission's nation-wide con-

Officers (seated) of Atkins Pioneers Club: Left to right: George Penrod, vice president; Emerson Baker, assistant secretary; Fred Uhl, secretary; John Sapp, retiring president; Scott E. Dill, president; L. Z. Beckwith, treasurer; William Weaver, visitor. A group of new members is seen standing; others are not shown

90% OF ALL V-BELT DRIVE PROBLEMS SOLVED ECONOMICALLY WITH TEXROPE

Pre-Engineered Drives

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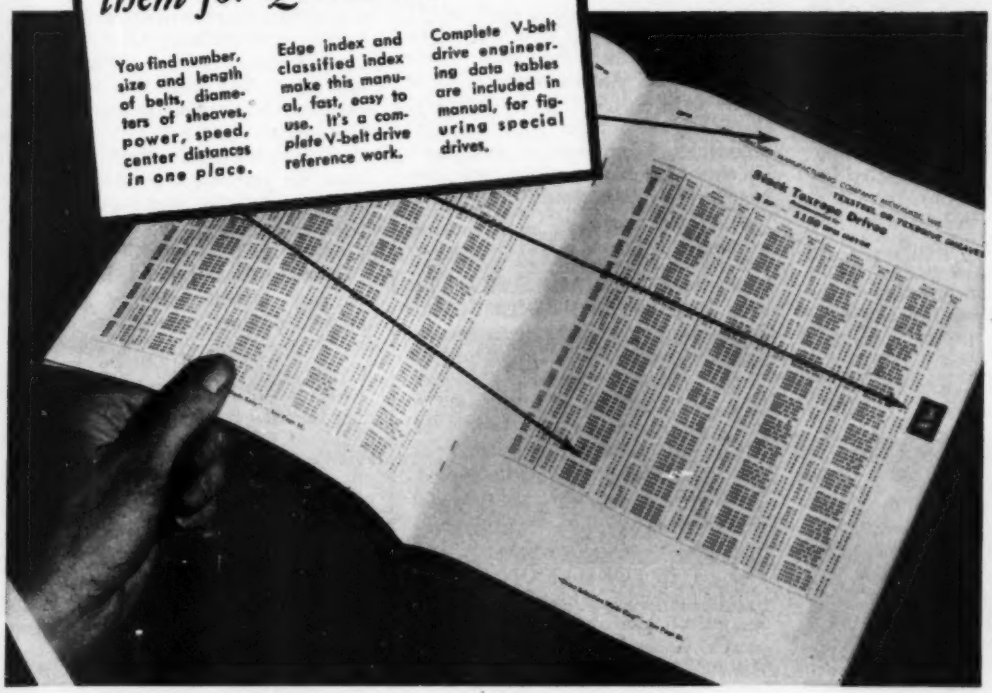
This New Manual Lists them for Quick Reference
You find number, size and length of belts, diameters of sheaves, power, speed, center distances in one place.
Edge index and classified index make this manual, fast, easy to use. It's a complete V-belt drive reference work.
Complete V-belt drive engineering data tables are included in manual, for figuring special drives.

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.

SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

USING STOCK BELTS AND SHEAVES, Texrope engineers have selected the *best* drive for each requirement . . . the drive most economical in first cost and in maintenance.

Only Allis-Chalmers offers you this complete Pre-Engineered drive manual. It is the product of 23 years of industrial V-belt drive experience, the finest engineering talent in the business.

Here is a book that will save you time and money in the purchase of V-belt drive equipment. Copies have been sent to many Texrope users and dealers. If you don't have a copy yet, write for Texbook No. 20P40. ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2335

Texrope, Super-7, Texsteel, Texdrive, Magic-Grip and Vari-Pitch are Allis-Chalmers Trademarks

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One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great

struction and research development.

The installation will be for the investigation of basic chemical problems in the field of atomic energy. It is located at the site of the Scioto Ordnance Works. Approximately 1200 acres have been acquired from the War Assets Administration. Existing facilities will be utilized as much as possible, with new construction of laboratory buildings for technical operations. The laboratory structures will be of a fireproof type and include the latest developments in safety devices.

The plant will be in charge of Dr. Hochwalt, company vice president and director of its central research department at Dayton; he is also in charge of Monsanto's AEC facility at Miamisburg, Ohio, nearly completed. The plant is expected to employ about 100 persons.

▼

RYERSON CO. COMPLETES NEW STEEL SERVICE PLANT ON THE PACIFIC COAST

Across the bay from San Francisco, in Emeryville, California, is a new steel service plant just completed by Joseph T. Ryerson & Sons, Inc. It is expected the plant will be open for service in the very near future.

The main building is of steel frame construction on a concrete base, with side walls of windows and a special type of metal siding. It is 720 feet long and 220 feet wide.

Also of steel and concrete construction is the office building, providing 11,000 square feet of space. This building contains locker, shower and rest rooms for employees.

Operating equipment in the plant consists of the latest and most efficient types of high speed handling and cutting machines. Special attention has been given machinery for cutting, handling, and forming concrete reinforcing bars. A fleet of modern type, heavy-duty, steel service trucks will deliver steel to a wide area throughout Northern California.

This is Ryerson's second plant in California, a new one in Los Angeles having been placed in operation in October, 1946.

▼

STEEL SCRAP COLLECTIONS RECOMMENDED TO COMBAT CRITICAL NAT'L SHORTAGE

A critical shortage of iron and steel scrap for use in steel mills and foundries is being recognized throughout the nation. The Chicago Association of Commerce and Industry has written to its members, urging them to conduct scrap clean-up campaigns and to encourage their suppliers and customers to do the same.

The American Brake Shoe Company, New York, is making an extensive scrap drive among its sixty plants and 10,000 employees. Lack of scrap metal has reached the point where some of the American Brake Shoe plants have only a few days' supply, according to William B. Given, Jr., president. A preliminary test drive which was recently conducted in two company plants revealed 200 tons of usable scrap metal.

▼

▶▶▶ ADDITIONAL SPACE has been leased at 2300 Linden Avenue, Zanesville, Ohio, in order to consolidate all Zanesville operations of The Timken Roller Bearing Company. Shortly after May 1, all operations of the Timken company now divided among three plants at 825 Main Street, 120 South Sixth Street and 32-38 South Seventh Street, will be concentrated under one roof.

▼

▶▶▶ THE FORMATION OF a senior technologists' group in the Process Section of Monsanto Chemical Company's General Engineering Department has been announced. The new group, established to provide specialized technical aid to all divisions and departments of the company, will be directed by J. M. Graham, Jr. The men comprising the group will be Hart U. Fisher, instrument technologist; Alban J. Lobdell and Robert York, Jr., chemical engineering technologists; and Frank LeRoy Whitney, Jr., corrosion technologist.

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▶▶▶ IN A RECENT campaign sponsored by their Ten-Year Club, employees of The Foxboro Company, Foxboro, Massachusetts, contributed nearly $3,500 toward the development of an athletic and recreation field on land adjoining the main office and factory.

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▶▶▶ THE SUCCESS OF its first motion picture film has led Harris-Seybold Company, Cleveland, Ohio, to offer another motion picture in sound and full color. The film deals with copy preparation for offset lithography and is aimed directly at advertising agencies, advertisers and others charged with the responsibility of purchasing printing. It is designed for use by lithographers and printers in their own promotional programs. The first film "How to Make a Good Impression" has been shown more than 600 times since its premier late in 1946.

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▶▶▶ A NEW DISTRICT SALES office has been opened by Link-Belt Company of Chicago at Charlotte, North Carolina. Thomas H. Appleton, formerly district sales engineer at Baltimore, has been appointed district sales manager in charge of the new office.

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▶▶▶ FIFTY-EIGHT EMPLOYEES of the General Electric Company, Schenectady, New York, who performed work of outstanding merit during the years 1946 and 1947, have been presented with Charles A. Coffin awards for their accomplishments. Named for the first president and one of the founders of the General Electric Company, the Charles A. Coffin awards carry a certificate and a cash honorarium.

▼

▶▶▶ A FORWARD STEP in industrial effluent disposal has been taken by the Calco Chemical Division of the American Cyanamid Company, Bound Brook, New Jersey. A new department for control of plant effluent has been established with D. M. Aumack appointed as manager. The operation of effluent and treatment facilities at all Calco plant sites will be handled by this new department.

Air view of the Joseph T. Ryerson & Son, Inc., new steel-service plant in the San Francisco Bay area

▶▶▶ CONSTRUCTION OF a new $3,000,000 general chemical plant in Avon Lake, Ohio, is being planned by the B. F. Goodrich Chemical Company, Cleveland. The new plant will be located on the tract owned by the company in Avon Lake, where its chemical experimental station is already located. The chemical products to be made in the new plant will supplement the company's present polyvinyl chloride resin, American rubber and organic chemical products.

▼

PAPERMAKING ATLAS IS PUBLISHED IN BOOK FORM BY DRAPER BROS. COMPANY

Maps of states showing the location of paper mills have appeared serially in business periodicals during 1945, 1946, and 1947 over the signature of Draper Brothers Company, Canton, Massachusetts.

A reprint of these maps has been compiled for Draper by William Bond Wheelwright and published in book form under the title "Draper's Atlas of American Paper Making." The data that have appeared with these maps are revised, bringing the figures as nearly up to date as possible. A brief history of papermaking in the United States is given in the introduction.

This book is attractively bound with a stiff cloth cover stamped in gold. It will be useful in any papermaking library.

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▶▶▶ A SALES OFFICE in Portland, Oregon, has been established by the Monsanto Chemical Company. The office will be staffed by Baxter Pearson, representing chemical and plastic sales, and W. W. Hayes, in charge of coating and adhesive sales.

▼

▶▶▶ A LOUISVILLE SALES office has been established by Link-Belt Company, Chicago. Emmart LaCrosse, Jr., former district sales engineer at Indianapolis, has been appointed district sales manager in charge of the new office.

▼

▶▶▶ THE INSTALLATION to be operated in Miamisburg, Ohio, for the Atomic Energy Commission by Monsanto Chemical Company is to be officially named the Mound Laboratory after the famous Miamisburg Indian Mound. Approximately 450 Monsanto personnel will conduct fundamental chemical studies in nuclear science in order to develop processes, procedures, and techniques which will be applied to the nation's atomic energy operations.

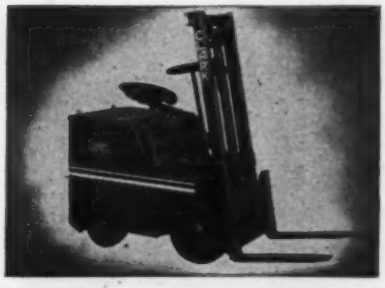
MATERIAL HANDLING *News*

You'll appreciate why Clark Electric Battery-Powered Fork Trucks enjoy an extraordinary leadership when you consider these basic advantages:

1. **Clark manufactures its own major units**
2. **Clark enjoys the benefit of assembly line production**
3. **Clark provides maximum interchangeability of parts**

Among industrial executives who *know operating costs* of electric fork trucks—taking into consideration initial investment, maintenance cost and operating cost—Clark electric fork trucks are preferred by a generous margin.

These men's opinions may be summarized in the terse comment of one of them—"Clarks cost less!"



Here is electric battery power in fast, maneuverable form — instantly applicable to countless routine assignments.

1. VOLUME MANUFACTURE EFFECTS BIG SAVINGS

It is a fact scarcely in need of emphasis to production men that the volume manufacture of Clark machines achieves many important economies. Practically all the major units in Clark machines are produced in Clark's own plants, and on a mass scale—axles, transmissions, wheels, frames and smaller units. All these units must meet the exacting standards established for Clark Products. All possess that rugged excellence that has built the Clark reputation for fine engineering.

Economical assembly saves dollars for customers. Here electrical control gets final inspection.

2. ASSEMBLY-LINE ECONOMIES

A further benefit passed along to users of Clark machines derives from Clark's assembly-line production. Inasmuch as Clark builds both types of fork truck—electric battery-powered and gas-powered—Clark's output is by far the largest in the industry.

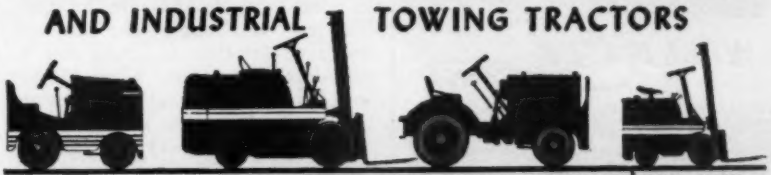
3. INTERCHANGEABLE PARTS

A third potent advantage springs from the maximum interchangeability of parts perfected by Clark. Insofar as is possible, parts used in electric trucks are identical with similar parts of gas powered trucks—a source of important savings to Clark users.

The fact that "Clark builds both" is worthy of repetition, and you realize why. Clark's recommendations are unbiased. You get wholly objective counsel concerning your operations and the types of machines that will serve you most efficiently and economically. Here, indeed, is a good recommendation!—CONSULT CLARK.

How to cut handling costs "to the bone"—in one easy picture-lesson.

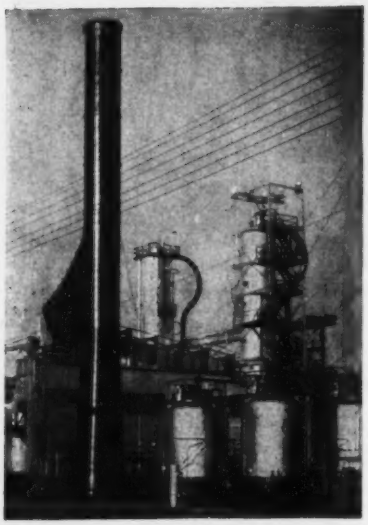
CLARK GAS AND ELECTRIC POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS



CLARK EQUIPMENT COMPANY, TRUCTRACTOR DIVISION, BATTLE CREEK 22, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

FOR THE WORLD'S LARGEST

Petroleum PRODUCERS



THERE are more Layne well water systems serving petroleum producers and refineries than all other makes combined! And this same overwhelming preference is true with just about every major industry in the Nation. With petroleum producers now using more water than ever before, their Layne well water systems are paying handsome dividends in giving absolutely dependable high peak production.

First of all, Layne well water systems and Layne vertical turbine pumps have always been noted for their superior engineering features. Next, they have always been manufactured from the finest materials available. And last, but very important, they are always installed according to Layne's exclusive standards. The results have been—more water, lower operation cost and longer life.

All of this adds up to the fact that for any situation demanding large quantities of well water at the ultimate in low cost, there is no equal to a Layne well water system. For literature address Layne & Bowler, Inc., General Offices, Memphis 8, Tennessee.

LAYNE WELL WATER Systems

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La. * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Pacific, Inc., Seattle, Wash. * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Western Co. of Minn., Minneapolis, Minn. * International Water Supply Ltd., London, Ont., Can. * Layne-Hispano Americana, S. A., Mexico, D. F.

SAFETY

ERNEST DUTCHER IS NAMED VICE PRESIDENT OF 10TH WESTERN SAFETY CONF.

Dates have been set for the 10th Annual Western Safety Conference to be held June 16-19, 1948, in Los Angeles.

Named as vice president of the conference is Ernest Dutcher, safety engineer of the Pioneer Division of The Flintkote Company. Mr. Dutcher will be one of those presiding over the conclave which it is expected will draw an attendance of more than 2,000.

Sessions of the Conference will be devoted to industrial, traffic, maritime, aviation, home, and commercial safety. Delegates are expected from Canada, Alaska, Mexico, Hawaii, and the western states.

▼

SAFETY STANDARDS MADE AVAILABLE FOR MECHANICAL CONVEYORS AND EQUIPMENT

An announcement from the American Standards Association states that the first nationally acceptable safety provisions for the construction and operation of mechanical conveyors and conveying equipment have just been made available.

Safety provisions for all types of conveyors are included in the new standard and special provisions for safe operation are given for each type. The safety of the operator is given first consideration, but the efficient use of the conveyor also has been kept in mind in selecting guards and other safety devices.

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▶▶▶ IN THE ACCIDENT prevention campaign conducted by Associated Industries of New York State, the Niagara Falls plant of the International Paper Company has received an award for a perfect score during the final quarter of 1947.

▼

▶▶▶ WORKERS OF THE pulp mill department of the Crossett Paper Mill at Crossett, Arkansas, were honored for their safety record for 1947 at a series of banquets in February. The pulp mill finished the year with only five lost-time accidents and 27 man-days of lost time. With 411,335 man-hours worked in 1947, this department's frequency rate was only 12.15 and the severity rate was .06. Runner-up was the maintenance department with an accident frequency of 13.56 and a severity rate of .07.

SAFETY SCORES

▶▶▶ TWENTY-ONE COMPANIES are still in the perfect record list in the Paper Industry Safety Contest which began June 30, 1947. For the sixth consecutive month the injury frequency rates are continuing their downward trend. The rate of 15.30 for six months was 2 per cent lower than the rate for the five-month period and was 3 per cent lower than the rate of 15.77 at the beginning of the contest. Likewise, contestants are also showing a reduction of 14 per cent in this contest, in comparison with rates in the previous competition.

Division I—Pulp and Paper Mills

Group A

(None.)

Group B

(None.)

Group C

The Mead Corp. (Sylva Div.), Sylva, N. C.

The Crystal Tissue Co., Middletown, Ohio.

Armstrong Cork Co., Pensacola, Fla.

Group D

Hollingsworth & Whitney Co. (Abenaquis Mill), Madison, Me.

Certain-teed Products Corp., Dallas, Texas.

Container Corp. of America, Carthage, Ind.

Fort Wayne Corrugated Paper Co., Vincennes, Ind.

Riegel Paper Corp. (Hughesville Plant), Riegelsville, N. J.

United States Gypsum Co., Oakmont, Pa.

National Gypsum Co., Garwood, N. J.

Kimberly-Clark Corp., Kapuskasing, Ont., Can.

Container Corp. of America (Western Container), Tacoma, Wash.

Division II—Paper & Board Remanufacturing

Group A

(None.)

Group B

Canadian Cellucotton Products Co., Ltd., Niagara Falls, Ont., Can.

Old Colony Envelope Co., Westfield, Mass.

Group C

Ft. Wayne Corrugated Paper Co. (Rochester Div.), Rochester, N. Y.

Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.

Container Corp. of America, Baltimore, Md.

The Flintkote Co. (Hollywood Paper Box Div.), Los Angeles, Calif.

The Hankins Container Co., Chicago, Ill.

Essex Paper Box Mfg. Co., Newark, N. J.

Bay West Paper Co., Green Bay, Wis.

they solve corrosion problems

All corrosion problems are not the same. The type of stainless steel casting you need for one application may not serve another. That's why you are ahead when you specify Chemalloy.

Chemalloy is not just one alloy. It's a lot of alloys—each suited for a particular job.

That's where the test discs come in. They eliminate all guesswork. If studies of your requirements do not supply sufficient information on which to base recommendations, these test discs are put to work.

Immersed in your plant unit—exposed directly to the actual service conditions under which your castings will be used—they determine the *right* alloy for *your* job.

By this method—you know *before* you order castings what results to expect. Maybe yours is an oxidizing acid problem. Perhaps you need a stain-resistant alloy to withstand high temperatures. Whatever you need—you can be sure of getting the *right* alloy when you specify Chemalloy. For more complete information, write direct to Electro-Alloys Division, Elyria, Ohio.

Chemalloy cast filter drum used in processing of penicillin, where stainless steel is a must in maintaining purity.

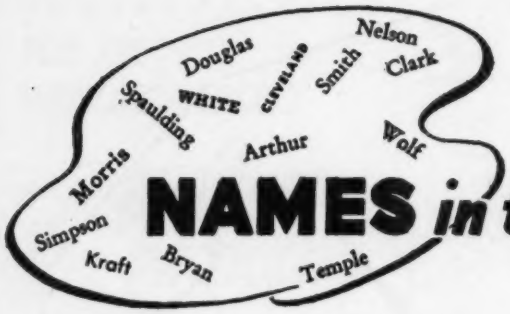
* * *

RECOMMENDED USES FOR CHEMALLOY

Filter parts **Kettles** **Mixer arms**
Pipe fittings **Valves**

AMERICAN **Brake Shoe** COMPANY

ELECTRO-ALLOYS DIVISION
ELYRIA, OHIO



PERSONALS

RHINELANDER PAPER CO. APPOINTS NEW PERSONNEL

At a recent board of directors meeting of the Rhinelander Paper Company, Rhinelander, Wisconsin, Robert F. Nelson was appointed executive vice president. Mr. Nelson is assistant to the president and is also director of sales.

Another announcement by the board was that Gunnar K. Tallgren has assumed the position of assistant sulphite superintendent. Fred Schueppert is the head of the newly organized traffic department; Ward Smith has been appointed to the position of forester, coming to Rhinelander from the U.S. Forest Service; and John Tuttle is a new member of the engineering staff.

▼

▶▶▶ Several members of the Union Bag & Paper Corporation, New York, have received promotion. *Fred Meendsen,* formerly manager of market research, has been appointed sales promotion manager; *Karl Smith,* former sales promotion manager, has been appointed merchandising manager of standard products sales; *R. J. Harley,* formerly eastern district sales manager, standard bag sales, has been appointed district manager of corrugated container sales; *R. Davis, Jr.,* former sales representative in charge of the Memphis office, has been promoted to southern district manager, standard bag sales; and *T. F. Duffy,* formerly New York metropolitan district manager for standard products sales, has been named northeastern district manager.

Fred Meendsen

▼

RETIREMENT OF JACOBY ANNOUNCED BY RIEGEL— NEW APPOINTMENTS TOLD

The Riegel Paper Corporation, New York, has announced the retirement of F. I. Jacoby, vice president and general superintendent. Mr. Jacoby started with Riegel in 1906 as a shipping clerk and became general superintendent after thirty-eight years of service. His total service with Riegel numbers forty-one years, the last three of which he was vice president as well as general superintendent. Mr. Jacoby is also a director of Riegel Paper Corporation and will continue to serve in that capacity.

G. Lamont Bidwell, who has been superintendent of the mill department at Milford, New Jersey, becomes manager of that mill, and R. L. Kerridge, who has been an assistant to Mr. Jacoby, becomes manager of three mills located at Warren Glen, Hughesville, and Riegelsville, New Jersey.

▼

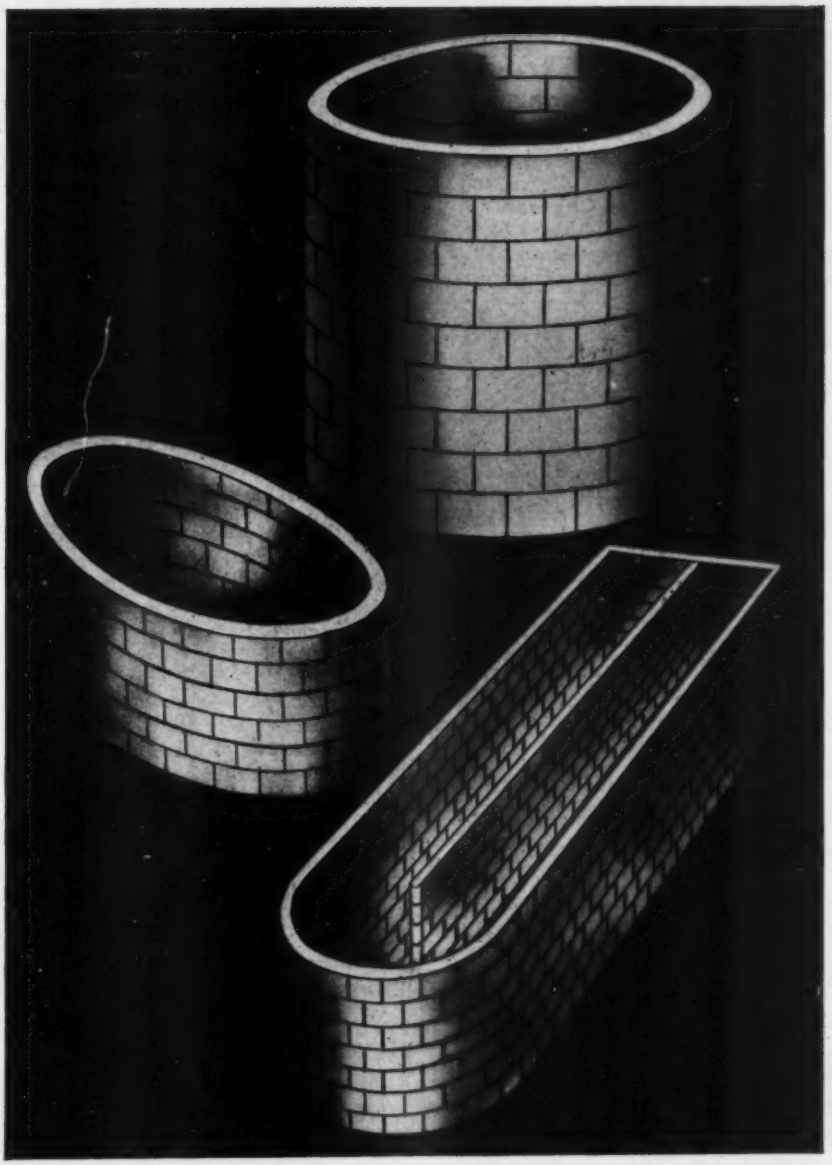
▶▶▶ Two personnel changes have been made by the Byron Weston Company, Dalton, Massachusetts, in connection with its modernization program and relocation of certain operations. In addition to their present duties, *Carl Wilson,* superintendent of the manufacturing department, will supervise operation of the dryers, and *Paul Tupper,* superintendent of the finishing department, will be in charge of shipping personnel.

F. I. Jacoby

G. Lamont Bidwell

R. L. Kerridge

ANY SIZE *or* SHAPE *of* PAPER MILL TANK *or* CHEST *can be built with*



Kalamazoo GLAZED TILE

Consult our Engineers for ESTIMATES

Complete Erection Service

KALAMAZOO TANK & SILO COMPANY

Kalamazoo, Michigan : U.S.A.

C. RICHARD NEWPHER MADE MANAGER OF IVANHOE DIV. OF RELIANCE ELECTRIC CO.

Production manager of the Ivanhoe division of The Reliance Electric and Engineering Company, Cleveland, for the past two years is C. Richard Newpher. He has recently been made division manager as well. In his enlarged

C. Richard Newpher

responsibilities, Mr. Newpher will also have charge of the plant at 1170 Ivanhoe Road in Cleveland.

Associated with Reliance since 1937, Mr. Newpher was a member of the sales engineering department until 1942, when he was made production manager of the company's wartime marine division. Subsequently, Mr. Newpher returned to sales engineering work in the Cleveland district office.

▼

JOHN RENO NOW WITH THE PACIFIC LUMBER COMPANY

For the past six years lumber products engineer of the National Lumber Manufacturers Association, John Reno has resigned to become affiliated with The Pacific Lumber Company as industrial engineer attached to the eastern sales office in Chicago.

While with the Association, Mr. Reno worked with government agencies in simplifying and improving specifications to enable better procurement and utilization of the lumber needed for our war effort. After the war, he returned to the preparation of promotional material for the lumber industry. He did some special work on the Association's literature and prepared teaching outlines covering commercial lumber properties, flooring, and wood preservation for the Thirty Day College Courses of the National Retail Lumber Dealers Association. Prior to joining the Association, Mr. Reno was for a number of years industrial engineer for the Florida Louisiana Red Cypress Company advising industrial users concerning the proper use of lumber in industrial applications.

Mr. Reno is well acquainted in the industry; he has spoken before the national gathering of the American Pulp and Paper Mill Superintendents Association.

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▶▶▶ Appointment of *Allan W. Low* as general superintendent of a new formaldehyde plant was announced recently by the plastics division of Monsanto Chemical Company at Springfield, Massachusetts. Mr. Low has been employed by the General Chemical division of Allied Chemical and Dye Corporation in manufacturing research and administrative capacities for the past twelve years.

▼

▶▶▶ General superintendent of the Tervakoski Paper Mill in Finland, *Erik Ungern,* has been in this country for three months studying American paper mill methods and equipment. In a talk recently in Holyoke, Massachusetts, Mr. Ungern stated that while Finland is gradually increasing her exports in pulp and paper, her most important industry, currency exchange rates and inflation are complicating the situation. He expects to be in the United States until the end of April.

▼

▶▶▶ A recent election meeting of The Rapids-Standard Company board of directors has disclosed *James R. Sebastian* as president and general manager of the Grand Rapids, Michigan, plants. Mr. Sebastian succeeds *Lloyd C. Backart,* who was named chairman of the board of directors. Other officers elected at the meeting were: *Roger S. Calvert,* secretary-treasurer; *Paul F. Millett, Howard R. Pearl* and *Robert L. Gunnell,* vice presidents; and *Eugene L. Hummell,* assistant secretary treasurer.

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▶▶▶ The Coupling Division of John Waldron Corporation, New Brunswick, New Jersey, has announced the appointment of *Henry A. Anderson* as manager. Mr. Anderson was formerly an executive in the sales and engineering departments of Ingersoll-Rand Company.

▼

▶▶▶ Recent changes in the factory management of Fairbanks, Morse & Company, Chicago, have been announced. *W. H. Holbert,* manager of the company in Stuttgart, Arkansas, for the past twenty years, has been appointed manager of the Three Rivers, Michigan, plant. *J. R. Walsh,* who has for several years been assistant manager of the Fairbanks, Morse Westco Works in St. Louis, has been transferred to the Stuttgart, Arkansas, Works and has been appointed works manager.

▼

▶▶▶ New positions have been assumed by *Fay Brainard* and *Svante Eikrem* of Hyster Company, Portland, Oregon. Mr. Brainard is special assistant to the general manager and will expedite projects in methods, inventory control, and similar fields. Prior to these new duties, he was plant engineer of the Portland plant. Mr. Eikrem will assume the plant engineer position. Since joining the company in 1943, he has worked on assembly line layout and on tool design in the Portland plant.

▼

▶▶▶ *James Fish,* superintendent of the Paterson Parchment Paper Company, Bristol, Pennsylvania, has been appointed director of manufacturing of the Erving Paper Company, Erving, Massachusetts. Before going with Paterson, Mr. Fish was associated with

James Fish

the research department of the Brown Company, Berlin, New Hampshire, where he worked on experimental pulps and papers. Mr. Fish is third vice president of The American Pulp and Paper Mill Superintendents Association.

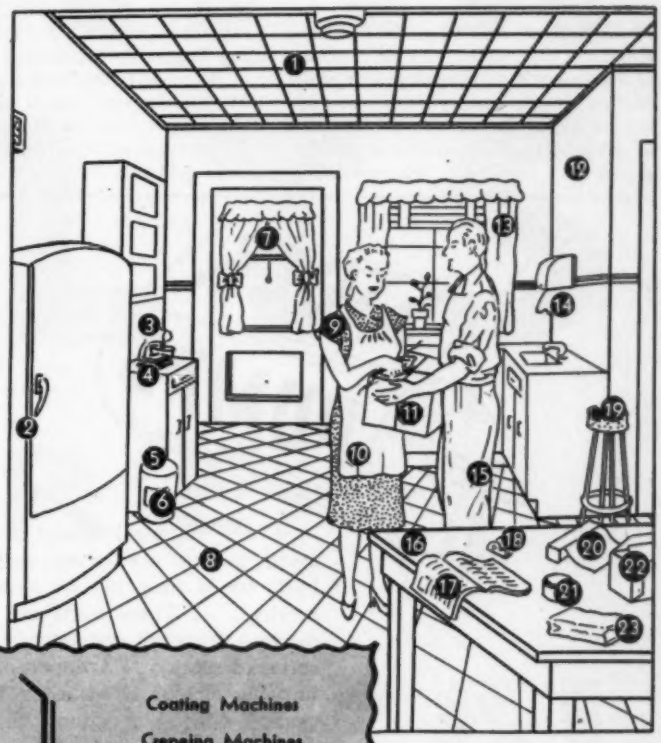
▼

▶▶▶ At the annual meeting of stockholders of West Virginia Pulp and Paper Company in New York City, *Fred A. Coe* was elected a director of the firm. Mr. Coe is resident manager of the Mechanicville, (N. Y.) plant of the company.

What next will be made with the aid of

WALDRON MACHINES

The 23 products of everyday use shown in this picture give some idea of how WALDRON Converting Machines make possible the manufacture of a steadily widening variety of salable articles. What next? Maybe the new product you have in mind!



1. Asbestos Panels
2. Door Lining
3. Elec. Insulation
4. Embossed Napkins
5. Fibre Board
6. Labels
7. Shade Cloth
8. Floor Covering
9. Printed Cloth
10. Rubberized Fabric
11. Decorative Paper
12. Plywood
13. Plastics Treated Paper or Cloth
14. Paper Towels
15. Men's Suiting
16. Plastics Table Tops
17. Coated Paper
18. Sealing Tape
19. Artificial Leather
20. Waxed Paper
21. Closures
22. Cartons
23. Bag Linings

Coating Machines
Creping Machines
Embossing Machines
Floor Cover Machines
Gumming Machines
Laminating Machines
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Rubber Mill Machines
Saturating Machines
Wall Paper Machines
Waxing Machines
Winders and Slitters
Special Design Machines

Here's how WALDRON can help you!

The wealth of knowledge and experience possessed by our Research and Engineering Staffs, plus the facilities of our experimental laboratory can help solve your development and processing problems. Why not consult us — in confidence, of course.

JOHN WALDRON CORP.

Main Office & Works – NEW BRUNSWICK, NEW JERSEY

BUILDERS OF QUALITY MACHINES SINCE 1827

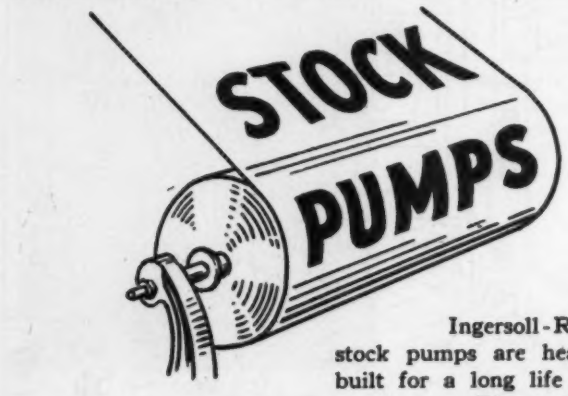
▶▶▶ *Charles A. Lee* has joined the staff of the Research and Development Laboratories of Kimberly-Clark Corporation (Neenah, Wis.). He formerly was employed by the U. S. Navy at Carderock, Maryland, as civilian chief of the Hydraulics Section of the Hydromechanics Division.

▼

▶▶▶ Federal Adhesives Corporation, Brooklyn, has added *Arnold S. Louis* to its research and development staff. He will work mainly with new adhesives from synthetic resins as well as giving technical service in solving customers' problems. He previously was connected with the consulting firms of Resinous Research Associates, Foster D. Snell, and Centro Research Laboratories.

▼

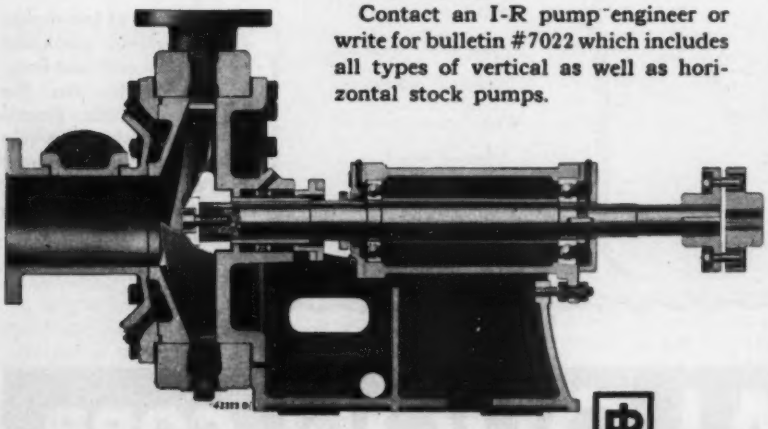
▶▶▶ The company board of directors has elected *Y. F. Hardcastle,* vice president in charge of manufacturing of the Pennsylvania Salt Manufacturing Company, as a board member. Joining Pennsalt's engineering department at Wyandotte, Michigan, in 1909, Mr. Hardcastle was named supervisor of the plant's electrolytic operations the following year. He became vice president in 1927.



Ingersoll-Rand horizontal stock pumps are heavy-duty units built for a long life of dependable service . . . These units are recommended for high consistency or unscreened stock . . . An open or closed impeller can be furnished with these pumps depending upon the service conditions.

For stock feed to the paper machine, the pumps may be equipped with an auxiliary feeder propeller and take-off in the suction nozzle to maintain a constant delivery regardless of the level of the stock.

Contact an I-R pump engineer or write for bulletin #7022 which includes all types of vertical as well as horizontal stock pumps.



Ingersoll-Rand
Cameron Pump Division
11 Broadway, New York 4, N. Y.
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AIR TOOLS · ROCK DRILLS
COMPRESSORS · TURBO BLOWERS
CENTRIFUGAL PUMPS · CONDENSERS
OIL AND GAS ENGINES

▶▶▶ Western sales manager of the Glyco-Ryertex Division of Joseph T. Ryerson & Son, Inc., Chicago, is *J. L. McDermott.* Having sales supervision in the area from Pittsburgh to the Pacific coast, Mr. McDermott is making his headquarters at the company's Chicago plant.

▼

▶▶▶ To augment its field engineering service, the Mixing Equipment Company (Rochester, N. Y.) has appointed *Edwin D. Lowthian* as senior process engineer. Mr. Lowthian recently served in the American Cyanamid Company's process engineering section. For five years he had been associated with the Chemical Warfare Service, and prior to that was employed by E. I. du Pont de Nemours Company.

▼

▶▶▶ *John J. Hart, Jr.,* has been named sales manager of a recently formed division of The Watson-Standard Company, Pittsburgh, which will service a new line of safety finish products for industry. Mr. Hart comes to Watson-Standard from the Lake Erie Engineering Corporation where he served as assistant manager of the Feller Engineering Division.

▼

▶▶▶ St. Louis sales manager of the Graham Paper Company for the past eleven years, *S. E. Chamberlin,* was elected a vice president recently. Mr. Chamberlin will have charge of merchandising all book, text, news and cover papers. *Ben J. Heggeman,* St. Louis city salesman since 1926, has been promoted to succeed Mr. Chamberlin as sales manager.

▼

▶▶▶ Former chief of the Packaging Section, Military Planning Division, Office of the Quartermaster General, *Lee Hickox,* has joined the staff of Container Laboratories, Inc., and will make his headquarters at their Chicago office. Prior to the war, Mr. Hickox spent more than ten years with the Container Corporation of America.

▼

▶▶▶ *C. B. Johnson* has been appointed as division manager of the Chicago office of the Darnell Corporation, Ltd. (Long Beach, Calif.) to succeed L. J. Clarke, who passed away recently. Mr. Johnson had served as Mr. Clarke's assistant for a number of years.

▼

▶▶▶ The appointment of *William F. Mitchell* as assistant vice president for the Pennsylvania Salt Manufacturing Company, Philadelphia, has been announced. Mr. Mitchell has served as superintendent of the Wyandotte,

TENAX FELTS ARE ECONOMICAL

SERVING THE PAPER INDUSTRY SINCE 1891

Our research and development is paying off for our customers in longer service and lower costs. If you would share in these advantages we suggest you afford us the opportunity of serving you.

LOCKPORT FELT COMPANY • NEWFANE, NEW YORK

Michigan, plant since 1945. *Gustave A. Nelson*, formerly assistant superintendent at Wyandotte, has been appointed as superintendent.

▼

OFFICIAL APPOINTMENTS ARE ANNOUNCED BY UPSON COMPANY

Two appointments to official positions with The Upson Company, Lockport, New York, have just been announced.

Henry W. Schmidt, who has been secretary of the company for the past several years has been elected secretary-treasurer.

James J. Upson (left) and Henry W. Schmidt

James J. Upson, who has been associated with the company in various capacities following service as a U.S. naval officer, has been appointed assistant to the president.

Mr. Schmidt is a member of the New Jersey Bar and has had experience as a member of the staff of the National Labor Relations Board.

▼

▶▶▶ A member of the technical department of Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, prior to the war, *Robert Bringman*, has rejoined its technical staff. His previous work in the company laboratory was on beater control and pulp and paper testing.

▼

▶▶▶ The Newport News Shipbuilding and Dry Dock Company has employed *Leon S. Dixon* in order to advance their subcontract work in the output of pulp and paper mill equipment. Formerly associated with Stone & Webster Engineering Corporation, Mr. Dixon has been engaged for many years in the design and construction of pulp and paper mills throughout this country and Canada.

▼

▶▶▶ The election of *Cecil F. Dawson* as president of the Dixie Cup Company (Easton, Pa.) has been announced by the board of directors. Mr. Dawson is chairman of the executive committee of the board and formerly was first vice president. C. L. Van Schaick has been elected executive vice president.

▶▶▶ Advertising manager of Oxford Paper Company (Rumford, Me.), *Philip L. Hovey*, has been transferred from the sales department to the manufacturing department where he will serve as assistant to Donald Appleton, who is in charge of manufacturing. Mr. Hovey has been associated with the Oxford company for ten years.

▼

▶▶▶ *Charles Lukens Huston, Jr.*, lineal descendent of Isaac Pennock, a founder of Lukens Steel Company (Coatesville, Pa.), has been elected a vice president of the company. Mr. Huston will continue as executive assistant to the president of Lukens.

▼

▶▶▶ Three new offices have been created by the Louis Allis Company, Milwaukee. Elected to the offices are *Louis Allis, Jr.*, vice president in charge of sales; *Frank O. Kovich*, vice president in charge of manufacturing; and *T. R. Wieseman*, vice president in charge of engineering.

▼

▶▶▶ Vice president of the Riegel Paper Corporation of New York, *A. P. Mitchell*, has been elected to the board of directors of Thomas A. Edison, Inc., West Orange, New Jersey.

NECROLOGY

EDGAR G. MURPHY

Edgar Guillow Murphy, 77 years old, passed away March 4 at his home in Norwalk, Connecticut. He was credited with conceiving the idea of establishing tidewater plants for converting pulpwood to pulp for paper.

Mr. Murphy was associated with the International Paper Company and then with the Union Bag and Paper Company where he was plant manager. In 1902 he organized the St. George Pulp and Paper Company which he sold to the *New York World* in 1920. He later became manager of the Hartje Paper Company, Steubenville, Ohio.

He is survived by three sons.

▼

▶▶▶ *Frank E. Greenwood*, one of the early members of TAPPI, passed away February 2 at the age of 76. Mr. Greenwood was associated with Joseph H. Wallace in some of the early developments of the kraft industry at Halifax Paper Corporation and the Southern Paper Company. He later was with the Wallace Laboratory (Stamford, Conn.) and the Munising Paper Company, from which he retired in 1940.

▶▶▶ Associated with the Boston Woven Hose and Rubber Company, Boston, since 1906, *Ralph Edwin Conder* passed away February 18. He had been advertising and sales promotion manager of the company for more than twenty-five years.

▼

▶▶▶ A retired Pennsylvania paper manufacturer, *William Lee Chadwick*, passed away in Fall River, Massachusetts, recently at the age of 65 years. Mr. Chadwick had been a director of the Kirby Saunders Corporation of New York, a former vice president of the United Paperboard Company of New Jersey, and owner of the McReary Paper Box Company of Erie, Pennsylvania. He is survived by his widow.

▼

▶▶▶ Widely known throughout the South, *James Gustafus Pace*, prominent lumberman and capitalist, passed away recently at the age of 80 years. A keen student of forestry and a staunch believer in the value of Southern pine, Mr. Pace lent his support to the formation of the plant of Florida Pulp and Paper Company, Pensacola, Florida. Two sons are officers of that company: J. C. Pace and A. D. Pace are vice presidents as well as secretary and treasurer, respectively.

▼

▶▶▶ A pioneer of the paper industry in Niagara Falls, New York, *Amasa Atwood Oatman*, passed away February 8 at the age of 84. Mr. Oatman served as treasurer of the Cliff Paper Company for many years until the firm was dissolved.

▼

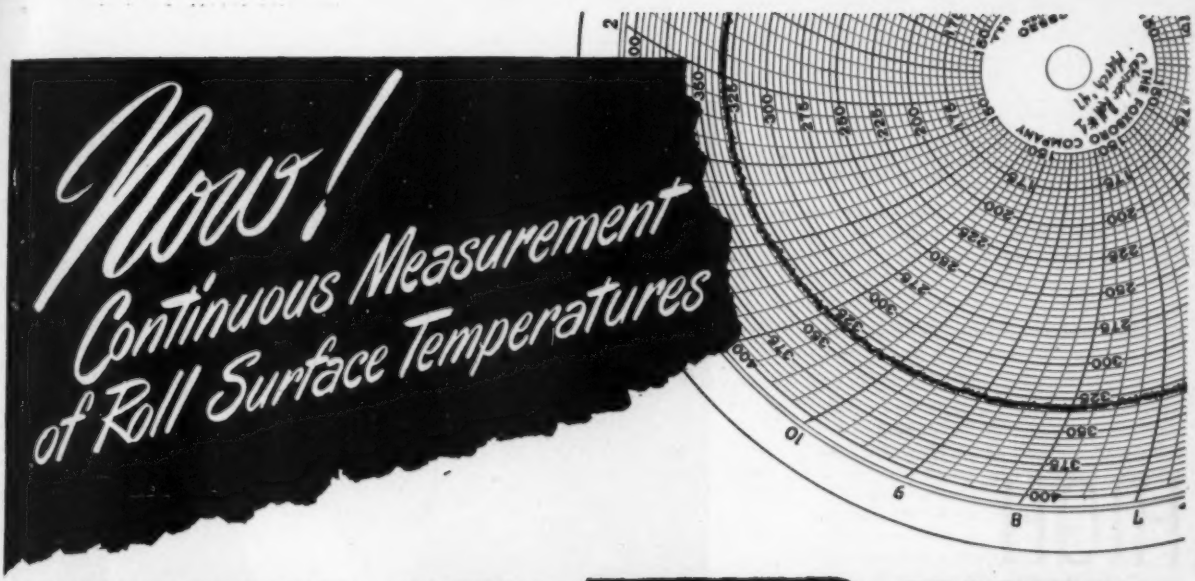
▶▶▶ Associated with the Hinde & Dauch Paper Company at Sandusky, Ohio, for twenty-nine years, *Fred M. Parker*, passed away January 29 in Crile Veterans Hospital, Cleveland. A veteran of the Spanish American War, he was 67 years old at the time of his death.

▼

▶▶▶ Vice president and director of L. Sonneborn Sons, Inc., New York, *Julius F. Roten*, passed away January 24 at Mount Sinai Hospital in New York. Mr. Roten was 59 years of age. He joined the Sonneborn company in 1905 and was instrumental in the development of improved methods of refining white mineral oils, petrolatums and petroleum sulphonates. His widow, a daughter, and a son survive.

▼

▶▶▶ Executive vice president of the Jessup & Moore Paper Company, Philadelphia, *Edwin A. Weihenmayer*, passed away February 5 at the age of 64. He had been associated with Jessup & Moore for forty-six years. He is survived by a son and a brother.

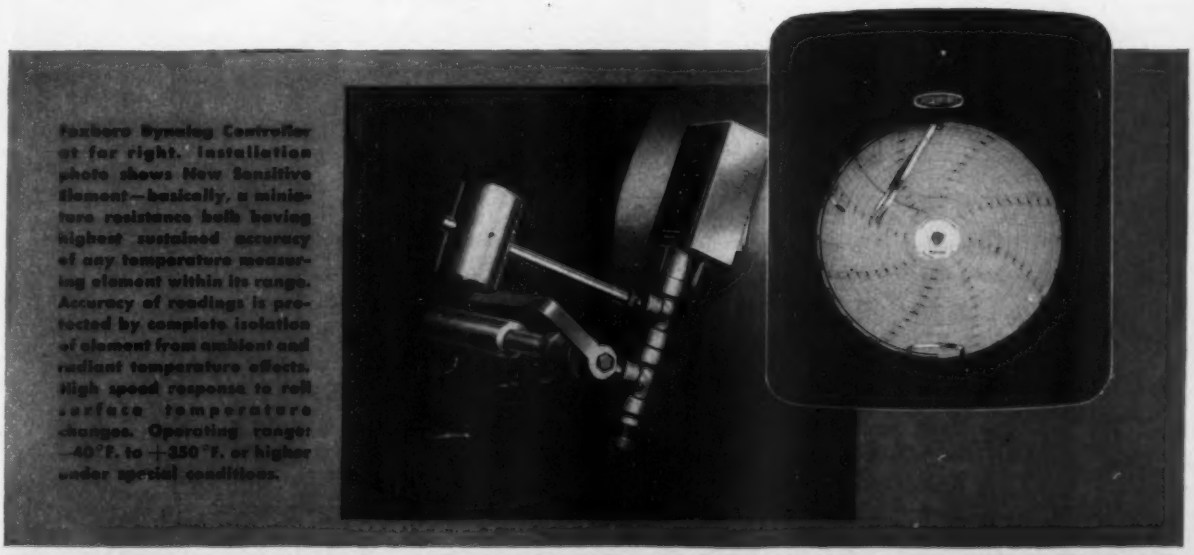


A UNIQUE, NEW FOXBORO SYSTEM

AN ENTIRELY NEW type of measuring head coupled with the sensitive, instantly-responding Dynalog Electronic Recorder solves a tricky problem of long standing. This combination has proven far more accurate—and convenient—in the continuous measurement of roll surface temperature than previous devices.

The Foxboro measuring element is very rugged, yet it bears so lightly (only 0.75 gm per sq. cm.) that it avoids any tendency to mark or score the roll. Errors due to friction, radiation, and convection, so common to conventional roll surface temperature bulbs, are completely avoided. Errors and inconveniences arising from use of hand-held surface pyrometers are eliminated. Recorder may be located up to 1000 feet away, connected with electric cable.

Using either a Dynalog Recorder or Controller, this is the system to install wherever closer, continuous measurement or control of roll surface temperatures means a saving in steam, a reduction in waste, a more uniform product. Get complete details—Bulletin 405. **The Foxboro Company, 158 Neponset Avenue, Foxboro, Mass., U. S. A.**

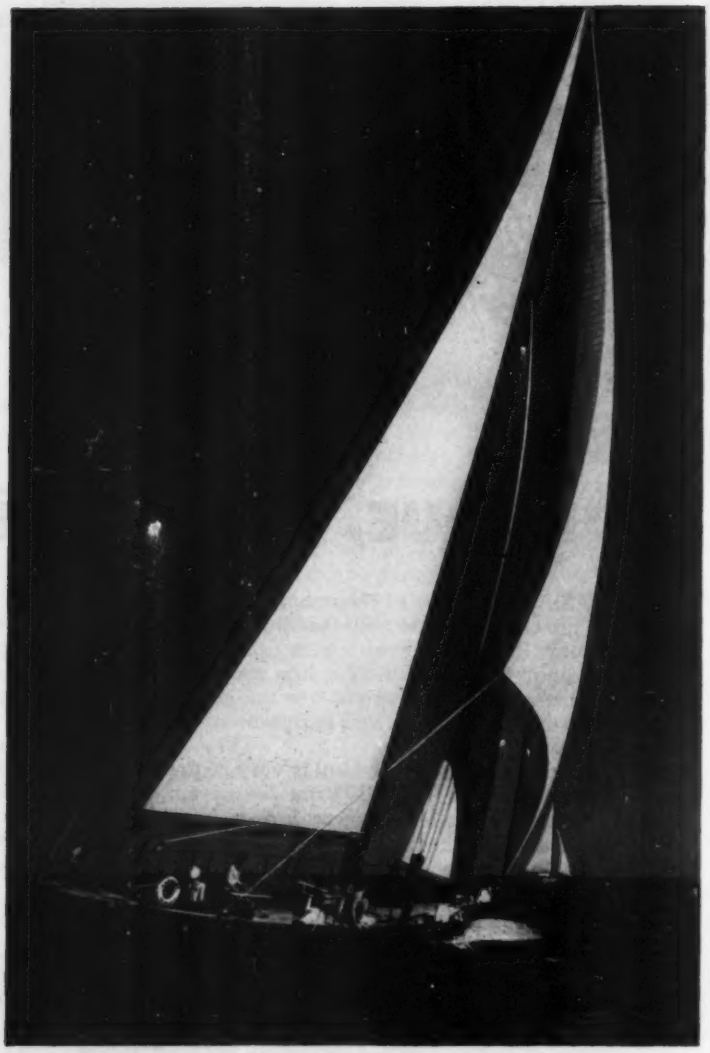


Foxboro Dynalog Controller at far right. Installation photo shows New Sensitive Element—basically, a miniature resistance bulb having highest sustained accuracy of any temperature measuring element within its range. Accuracy of readings is protected by complete isolation of element from ambient and radiant temperature effects. High speed response to roll surface temperature changes. Operating range —40°F. to +350°F. or higher under special conditions.

FOXBORO
REG. U. S. PAT. OFF.

RECORDING · CONTROLLING · INDICATING
INSTRUMENTS

HIGH WHITENESS



Gleaming sails and fine coated paper have this one quality in common.

To meet the increasing demand for *high whiteness* in coated sheets, many paper makers have turned to Wyandotte Precipitated Calcium Carbonate.

This superlative paper-coating pigment is known for its brightness and smoothness. It is unequaled in hiding power and ink absorption . . . in freedom from grit and abrasiveness . . . in the uniformity so essential to machine coating.

For many years, Wyandotte Chemicals Corporation has made a *business* of supplying the Paper Industry with the finest in Precipitated Calcium Carbonate. Why not take advantage of the long experience and extensive research that have gone into the making of this fine chemical? Write for complete information today.

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WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine • Hydrogen • Dry Ice • Glycols
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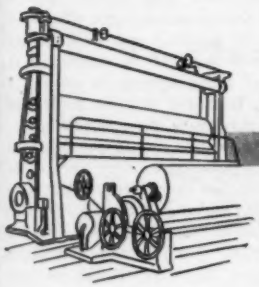
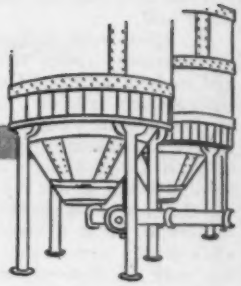


Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Electrical Apparatus in Hazardous Locations

Care and attention in assembling the covers of enclosures of explosion-proof electrical apparatus is necessary for safe performance of this equipment in the field. The time required for proper assembly of cover or other parts is insignificant compared with the hazard which may be introduced by improper assembly.

It must be realized that Class I apparatus will be subject to explosions within the enclosures when an explosive mixture has accumulated and an arc or spark occurs within the enclosure to ignite the explosive mixture. Under this condition, the flame paths must be long enough and of close clearance to arrest flame before it reaches the surrounding hazardous atmosphere.

The joints of Class II apparatus must prevent dust from entering the enclosure where it might interfere with the operation of the device, cause overheating, dielectric flash-over, or internal explosion. Overheating may cause the dust on the outside of the enclosure to be ignited, resulting in fire or explosion.

From the foregoing it will be seen that while it is the responsibility of the manufacturer to design and build a piece of equipment which has been found by test to meet the requirements of Underwriters' Laboratories, Inc., it is necessary for the user to install and maintain the apparatus properly. The following suggestions will be of assistance to those who have electrical equipment in hazardous locations under their supervision.

1. All ground joint surfaces must be protected against injury. Be careful in removing and replacing covers not to damage the machined surfaces. Do not stand the covers on edge on a hard surface or otherwise impair the joint surfaces.

2. Remove all dirt, sealing compound, or paint which may have accidentally accumulated on the joint surfaces. Grease is applied to prevent corrosion during shipping, and small particles of sand or other foreign material may adhere to the greased surface.

3. Before the cover is applied, a thin film of new grease or petroleum (vaseline) should be spread over both surfaces. The manufacturer of the apparatus will be glad to recommend greases which have been found by test at the Laboratories to be suitable for the purpose. Attention to this detail will help to prevent corrosion and keep the joints in good condition.

4. Pull the cover down evenly and tight, but not so tight as to strain the bolts.

5. Devices with threaded covers should be tight enough to prevent loosening in service, and the threaded joints should have at least five full engaged threads.—UNDERWRITERS' LABORATORIES, INC.

▼

Proper Shape and Angle of Hand Saw Teeth

Imagine the accompanying illustration (Figure 1) as representing a board, across which you wish to make a deep mark with the point of a knife. Suppose we hold the knife perpendicular as at B. It

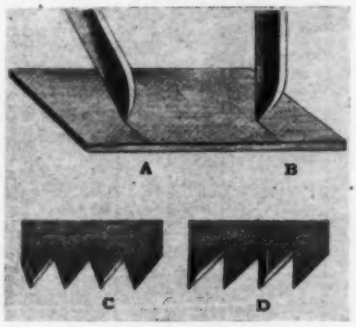


Figure 1

is evident that it will pull harder and will not cut as smoothly as if it were inclined forward as at B. It follows, then, that the cutting edge of the cross-cut saw should be at an acute angle as at C, rather than stand perpendicular as at D.

The angles 15 deg. front and 45 deg. back for cross-cut saws; and 8 deg. front and 52 deg. back for rip saws prove most satisfactory for general use. When a saw has less angle at the front of the teeth than these recommendations, it is said to have more hook or pitch. If too much hook is given to the teeth, the saw often takes hold too keenly causing it to "hang up" suddenly in the cut—resulting sometimes in a kinked blade. When there is too much set, the teeth may be broken, because the strain caused by the unnecessary amount of set is out of proportion to the strength of the blade.

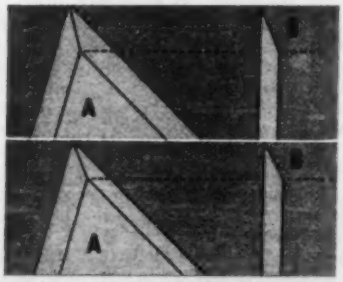


Figure 2 (above)—Figure 3 (below)

In filing saws for cross-cutting, the file is held at an angle, therefore, the teeth are given an angle. We speak of this angle on the front and back of the teeth as bevel.

Bevel of the Teeth

The proper amount of bevel to give the teeth is very important, for if there is too much bevel the point will score so deeply that the fibers severed from the main body will not crumble out as cut, but must be removed by continued rasping. The illustration (Figure 2), shows a tooth (enlarged) of a cross-cut saw with the same amount of bevel front and back. This saw with long front B is best suited for work in soft woods where rapid, rather than fine, work is required.

Figure 3 shows a tooth (enlarged) of a saw for medium hardwoods. This tooth has less bevel on the back which gives a shorter bevel to the point as at B.

It will be seen from these illustrations that the bevel on the front of the teeth is about the same, but the bevel of the point looking the length of the saw is quite different, depending upon the difference in the angles of the backs of the teeth. Here again, experience will indicate what is best.—*Disston Saw, Tool and File Manual*, HENRY DISSTON & SONS, INC.

▼

Twenty Grinder Wheel Pointers

1. By carefully tapping an unmounted wheel and noting the resulting sound, it is possible to detect any crack that might have developed from faulty handling.

2. In mounting a wheel, use wheel washers—also make sure you don't force the wheel on the center mount, or you might get a cracked wheel.

3. By tightening the center excessively or severely, the resulting strain might easily crack the wheel.

4. The grinding wheel should not be trued or dressed until the machine has had a chance to be warmed up while running idle. This will compensate for any contraction which might develop otherwise.

5. While truing with a diamond tool, there will be less chance of fracturing the

diamond if a generous quantity of coolant is used.

6. When using diamonds for the truing operation, always start from center and work to corners. This is done as a precautionary measure, as the corners wear to a slightly smaller diameter. .001 in. per pass should be sufficient.

7. If a high finish is required on the work, it is best to true the wheel by moving the diamond across the face as slowly as possible. If it is necessary to remove stock rapidly, disregarding the finish, you can work the diamond across the face at a higher rate of speed.

8. When using V-belts, be sure to check the alignment. This will add to the life of the belt. After being in use, V-belts will stretch and it is therefore necessary to adjust the tension.

9. Finish and accuracy on the part being ground will be impaired if there is too much clearance. Also a lot of dressings will be necessary. A spindle running too cool is usually the cause of such trouble.

10. When grinding requires a high finish, care should be taken to see that the coolant is properly filtered and the tank cleaned frequently, otherwise scratches will occur on the finished part.

11. Longer life of the grinding wheel can be obtained if the feed is made slow and regular. The abrasive will not break away before it has a chance to do its work.

12. Operators are often tempted to remove too much stock in one pass on the work. This causes the grinding wheel to break down too quickly, resulting in uneven wear and unsatisfactory finish.

13. On all roughing operations it is well to time the work speed in proportion to the traverse speed. The width of the wheel is a determining factor in the traverse. The wider the wheel, the faster the traverse. The traverse should be less than the width of the wheel for one revolution of the work.

14. Often the traverse speed of the wheel should be as low as ⅛ in. for each revolution of the work. This will tend to give higher finish to the work.

15. By slowing up the work speed and traverse speed and increasing the wheel feed, a greater amount of stock can be removed.

16. In grinding cam shafts or other irregularly shaped parts, it is necessary to have a slow work speed in order to follow the track. Fifteen to thirty fpm should be efficient for rough grinding, while 10 to 15 fpm should be used for finish grinding.

17. In event the grinding wheel is not the correct grade, the work speed can be increased to make the wheel perform softer. If the work speed is decreased, the grinding wheel will perform like a harder wheel.

18. If the entire machine is vibrating excessively, fine chatter marks may be found in the work. If the vibrations are caused by the headstock being loose, the chatter marks will appear to be coarser.

19. If headstocks employ gears, chains and sprockets, equally spaced chatter marks may be found on the work. The headstock should be checked.

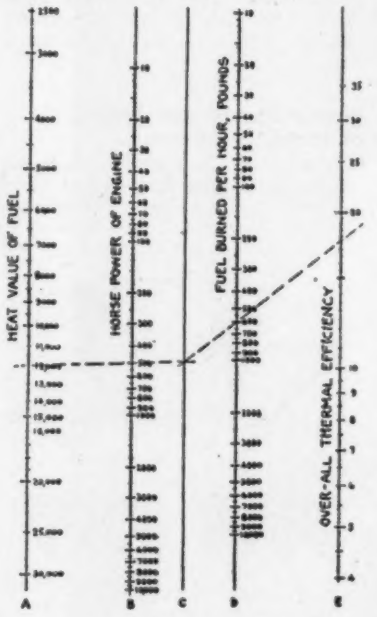
20. The use of a grinding wheel incorrect in grain or grade is the most usual cause of chatter, although improper dressing can cause the same trouble.—Adapted from data of THE MACKLIN COMPANY.

▼

What Is the Over-All Efficiency of Your Plant?

How much of the heat in your fuel do you utilize? How much of it is converted into work? Nine times out of ten the burner of fuel doesn't know, and it isn't such a complex thing to solve either. It often is an important matter.

This chart will give the answer closely enough, though, and you won't have to do any figuring at all in arriving at the result. Just lay a straightedge across the chart twice and the answer is immediately found in column E. The result may surprise you. Usually it is too low.



For example, let us assume that you burn coal. The average heat value of coal is about 12,000 heat units per pound, so we will use that figure in column A.

The horsepower of your engine is, say, 500. See column B. Run a straight line through these two points and locate the intersection with column C. You burn, say, 600 pounds of coal per hour. See column D. Run a straight line through the intersection in column C and through the 600 and the final intersection with column E gives the over-all "thermodynamic efficiency," as it is often called.

Therefore, in your plant, if conditions are as stated above, the performance is well above the average. Column E tells us that nearly 18 per cent of the heat in the coal is converted into work. More accurately, it is about 17.7 per cent.

The over-all efficiency is a thing that is worth knowing. If your efficiency is only 4 per cent you should make an effort to increase it to 8 per cent and cut your fuel bill in half. If it is 8 per cent you should try to make it 16 per cent and again cut the fuel bill in half. And so on.

Occasionally we find steam power plants where the thermodynamic efficiency is as high as 20 per cent, but such plants are entirely too rare. It is claimed that most plants of today operate at or under 6 per cent. Four per cent is made the minimum on this chart, because such ridiculously low efficiencies should not be practiced—except, possibly, in very rare cases where fuel costs are exceedingly low. The writer wants to make this chart a stimulus for greater effort toward saving fuel of all kinds. Fuel, you know, is becoming more and more rare. It should be conserved.

The range of this chart has been made wide enough to handle nearly any situation—from 2,500 heat units per pound (green wood) to over 30,000 heat units. Fuel oil averages about 18,500.

Internal combustion engines in general have higher efficiencies than steam. Thus efficiencies of 40 per cent are not uncommon with Diesel engines.—W. F. SCHAPHORST, M.E.

▼

Paper Machine Rolls—Importance of Correct Crown Shape

Most of the various types of paper machine rolls are comparatively small in diameter for their length, and as a result they have a tendency to sag through their own weight. To offset this deflection, it is necessary to crown some of the rolls a slight amount.

Crown is of special importance on the bottom roll of calender stacks. In fact, the successful operation of the stack depends primarily upon the correct crown of the bottom roll, which carries the weight of the entire stack, as well as the pressure often applied to the journals on the top roll. The crown should be of such a shape as to produce, when the roll is carrying the superimposed load upon its journals, a uniform pressure throughout the contact between the roll and the one next above it. The roll manufacturer should be consulted in regard to the proper amount of crown for the rolls in a given stack.

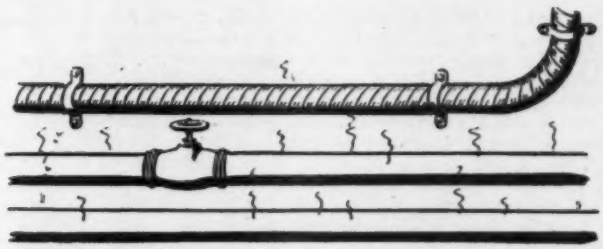
Occasionally the roll next to the bottom one is also crowned, but it is not necessary to crown the intermediate rolls as these are supported by the rolls beneath.

When the stack is assembled, the rolls must fit so accurately one over the other that when a light is passed along the juncture or nip of the rolls on one side, no light can be observed showing through on the other side. If the rolls are not light tight, they should be taken out of the stack and reground.

Rubber press rolls must also be ground with a curved (not tapered) crown. This must be accurately determined and will depend upon such principal factors as the dimensions and density of the rubber covering, the shell body construction, and the grade of paper manufactured. While tables are available that will serve as a guidance to the relative amount of crown for various diameters and lengths, it is advisable to consult the rubber roll supplier in regard to the exact crown for a particular roll.—NORTON COMPANY.

To Prevent Interruptions in Electrical Service

DON'T use grease to facilitate pulling wires through a conduit. Always use either talc or soapstone.

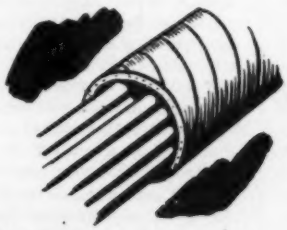


DON'T install conduits parallel to steam pipes, or in steam tunnels or other hot locations without adequate protection. Where wires or cables are installed in boiler rooms or other locations where high temperatures are constant, the installation should be kept cool by using a fan to blow hot air away from the wires or cables.

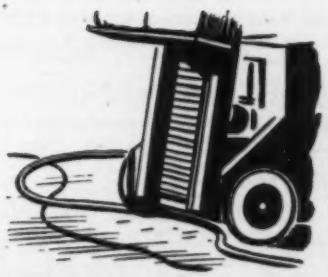
DON'T pull exposed wiring too tight if it is installed in hot weather, as the contraction caused by cold weather may snap the wire.

DON'T let portable cords and cables run through pools of water, chemicals or oil, or lie in accumulations of grease. These materials shorten the life of the insulation.

DON'T scrap odd lengths of wire and cable unless no use can be found for them.

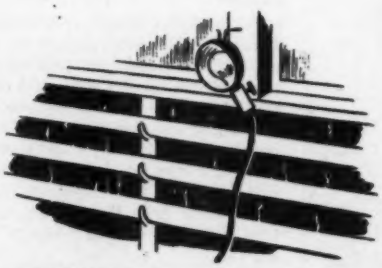


DON'T attempt to crowd too many wires into a conduit. Conduits are made to accommodate a given number of wires of a given size—to jam more into the space is to lessen efficiency.



DON'T be careless with portable cords and cables—they are too hard to replace. DON'T let them run across aisles where trucks or other wheeled equipment may run over them.

DON'T take chances on explosions—be sure to use explosion- or vapor-proof equipment in hazardous gaseous areas, and water-tight equipment in wet areas.



DON'T let portable cords run over or under steam pipes or other heat-transmitting equipment.

Adapted from material of Anaconda Wire and Cable Company.

Newsprint Paper in 1947

J. J. ZIMA, Statistician
News Print Service Bureau

▶▶▶ A NOTABLE FACT about the year 1947 is that the volume of business activity in the United States ran counter to the almost universal forecasts of a business recession which were prevalent at the beginning of that year. Instead of the predicted decreases, practically all industries established new peacetime or all-time high records.

On the basis of data at present available, the output of the paper and paperboard industry in North America north of the Rio Grande—production south of that river is of no very great consequence—rounded up to a little more than 27,000,000 tons of paper and board in 1947. This was the largest tonnage on record and was greater, by more than 2,000,000 tons or nearly 9 per cent, than in 1946. Production in the United States amounted to 77½ per cent of the total, Canada contributed 21 per cent while Newfoundland's output represented nearly 1½ per cent.

The continental newsprint paper industry for the second successive year surpassed all previous production records. The rate of increase over 1946, while fairly substantial, was somewhat below that for all manufacturers of paper and board. However, this greater production was still apparently insufficient to satisfy the over-all demand.

Newsprint Exports from Canada
(Short Tons)

Year	U.S.A.	Overseas	Total	Per cent of Production
1947	3,675,000	545,000	4,220,000	95
1946	3,323,000	535,000	3,858,000	93
1945	2,534,000	525,000	3,059,000	94
1944	2,409,000	397,000	2,806,000	94
1943	2,545,000	265,000	2,810,000	94
1942	2,792,000	213,000	3,005,000	95
1941	2,762,000	500,000	3,262,000	95
1940	2,586,000	657,000	3,243,000	95
1939	2,207,000	452,000	2,659,000	93
1938	1,938,000	487,000	2,425,000	92
1937	2,899,000	556,000	3,455,000	95
1936	2,399,000	594,000	2,993,000	93
1935	2,052,000	523,000	2,575,000	94
1934	1,960,000	454,000	2,414,000	93
1933	1,520,000	318,000	1,838,000	91
1932	1,520,000	257,000	1,777,000	93
1931	1,753,000	255,000	2,008,000	90
1930	2,008,000	325,000	2,333,000	93
1929	2,173,000	342,000	2,515,000	92
1928	1,935,000	272,000	2,207,000	93

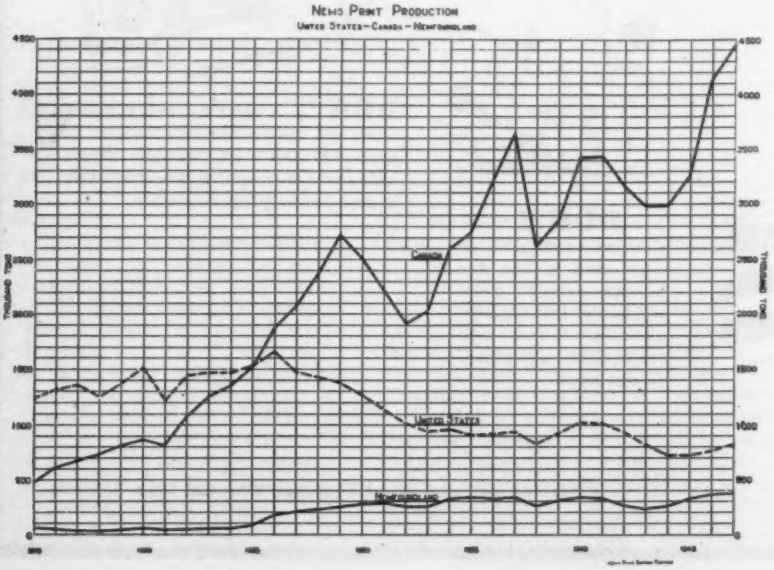
Production

Doing their utmost to keep pace with the unprecedentedly high demand for their product, the North American mills engaged in the manufacture of newsprint paper turned out 5,646,000 tons in 1947. This was an increase of 369,000 tons or 7 per cent over the record production in 1946 and also was 702,000 tons or 14 per cent above that in the prewar peak year of 1937. In the past two years there has been a combined increase in production amounting to 1,330,000 tons.

Production in every month of the year was greater than in any corresponding month on record. Output in the month of May was above that of any preceding month and was in turn exceeded in October when, for the first time in history, the monthly total was more than 500,000 tons.

Of the continental total, Canadian mills turned out 4,447,000 tons or not quite 79 per cent; the United States segment of the industry produced 826,000 tons or approximately 14½ per cent, while the remaining 6½ per cent was represented by Newfoundland's production which amounted to 373,000 tons. While there was very little change from the 1946 per cent of total figures, they compared with 74 per cent for Canada, 19 per cent for the United States and 7 per cent for Newfoundland in 1937.

Canadian production in 1947 exceeded that of the preceding year by 304,000 tons, or slightly more than 7 per cent; the increase in the United States was 55,000 tons or 7 per cent, while the gain in Newfoundland's output, which was curtailed somewhat due to pulpwood shortage at one of the mills earlier in the year, amounted to 10,000 tons or 3 per cent. Production of newsprint in Canada and Newfoundland attained record proportions last year while that in the United States was greater than in any year since 1942, but was less than half the tonnage produced in 1926, the year of largest output in this country.



Shipments of newsprint paper from all mills totaled 5,706,000 tons in 1947 and were 447,000 tons or 8½ per cent greater than in 1946. They were also larger than production by 60,000 tons and resulted in a corresponding decrease in stocks held by all manufacturers. Canadian mills shipped 354,000 tons more than in the preceding year, while movement of paper from producing points in the United States and Newfoundland exceeded that of 1946 by 70,000 tons and 23,000 tons respectively.

Total manufacturers stocks on December 31, 1947, amounted to 102,000 tons and were 37 per cent below those of a year earlier. In the course of the year the Canadian mills reduced their stocks by 43,000 tons or almost one-half, while the decrease in those held by United States and Newfoundland producers was 7,000 tons or 45½ per cent for the former and 10,000 tons or 17 per cent for the latter. These stocks were equivalent to less than one week's production at the rate attained last year.

Exports

According to official reports issued by the Bureau of Statistics, exports of newsprint paper from Canada in 1947 amounted to 4,220,000 tons with a value of $342,300,000 and both in tonnage and value thereof were the largest ever recorded. This was an increase of 363,000 tons or about 9½ per cent in volume and $76,400,000 or 29 per cent in value over 1946. Newsprint exports accounted for more than 12 per cent of the total value of Canada's export trade last year.

The record for the past two decades as compiled from official reports is shown in the acccompanying table.

Of the total tonnage exported, 3,675,000 tons or 87 per cent was shipped to the United States, while 545,000 tons or 13 per cent was destined for overseas markets. The quantity exported to this country was the largest on record and surpassed that of

the preceding year by 352,000 tons, while shipments elsewhere were only 10,000 tons greater than in 1946 and were not equal to those in a number of earlier years. With the exception of the war years 1942-43 when, of necessity, overseas exports were drastically curtailed, the United States received a greater proportion of Canadian export shipments in 1947 than in any one of the preceding 16 years.

In the order named, Australia, the United Kingdom, and Argentina were the largest overseas importers of Canadian newsprint in 1947 and between them took 49 per cent of the total. Shipments with Australia as their destination totaled 162,000 tons, those to the United Kingdom were 56,000 tons and to Argentina 50,000 tons. The corresponding figures for 1946 were 135,000 tons, 83,000 tons and 46,000 tons.

In 1947, the Newfoundland mills shipped 212,000 tons to the United States and 169,000 tons to overseas, making a total of 381,000 tons which exceeded the 1946 record by 22,000 tons or 6 per cent. Exports to the United States represented almost 56 per cent of the total and were 4,000 tons greater than in the preceding year. They also were larger than in any other year except 1941 and were but 5,000 tons below that year. While there was an increase of 18,000 tons over 1946 in exports to overseas destinations, the total was 13 per cent below that of 1945 and 20 per cent below the 1937-1940 average.

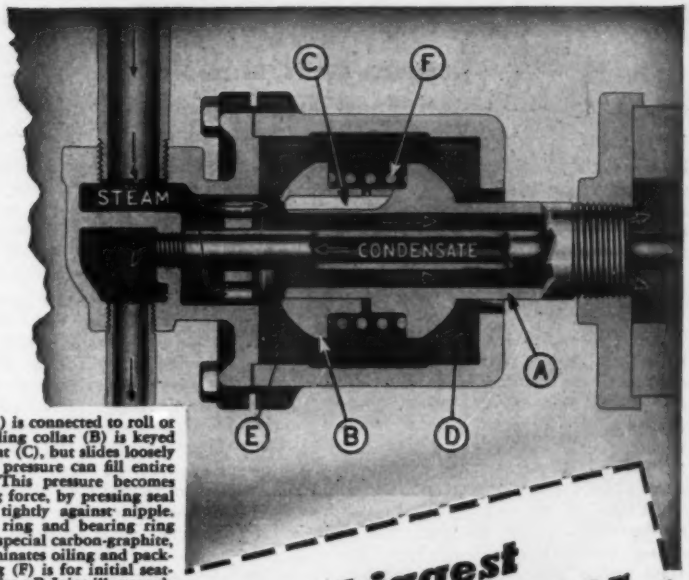
Direct shipments made by United States newsprint manufacturers beyond the borders of this country are reported to have totaled slightly more than 8,000 tons in 1947 and were of the same order as in 1946, but were substantially below those in any year since 1939. These shipments amounted to but 1 per cent of production.

The North American newsprint industry as a whole shipped 722,000 tons of paper last year to markets elsewhere in the world or 28,000 tons more than the 694,000 tons exported in 1946. The 1947 total would have been larger had it not been for governmental restrictions imposed on the importation of newsprint into certain countries.

Imports

Changes recently made in official regulations have further delayed the release of United States newsprint import statistics. All we have available at present are the figures for eleven months of 1947 which indicate a record total for the year of about 3,890,000 tons or 400,000 tons more than in 1946. On the basis of the eleven months' record, 92 per cent will have come from Canada, 5 per cent from Newfoundland and 3 per cent from Europe. The indicated 1947 total from Canada is the largest on record; imports from Newfoundland are below those of last year while those from Europe are much greater than in 1946, but only one-half the average in the years 1935-1939.

The largest tonnage of European newsprint came from Finland with 68 per cent of the indicated 125,000 tons of overseas imports originating in that country. Sweden, supplying approximately 16½ per cent of the total was next in importance. The balance was represented by relatively small quantities from France, Norway, Austria, Poland and the Netherlands.



Nipple (A) is connected to roll or drum. Sliding collar (B) is keyed to nipple at (C), but slides loosely over it so pressure can fill entire housing. This pressure becomes the sealing force, by pressing seal ring (D) tightly against nipple. Both seal ring and bearing ring (E) are of special carbon-graphite, which eliminates oiling and packing. Spring (F) is for initial seating only. Type B Joint illustrated; other types, sizes for all needs.

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Review and Outlook for the Kraft Paper Industry

DERNELL EVERY, Secretary
Kraft Paper Association, Inc.

▶▶▶ DURING 1947, the manufacturers of kraft paper established a new record in the production and shipments of unbleached kraft paper. Annual production of this paper exceeded two million tons for the first time in the industry's history, and bettered the production for 1946, the former record year, by 13 per cent.

Although each individual mill may look back upon 1947 as having contained some difficulties, the industry as a whole operated full throughout the year. The industry was not plagued by raw material shortages such as existed in 1946. It is true that market pulp was hard to obtain without bidding for it in a tight "spot" market, but only about 10 per cent of the industry now depends upon purchased pulp. Even so, no paper made from market pulp was unsold because of resulting higher prices. Faced with only minor obstacles and enjoying apparently unsatiable demand for its products, the industry ran as fully as machines can operate; between 95 per cent and 100 per cent of computed capacity.

Unbleached kraft paper is generally classified into one of three "use" categories. The oldest and most generally underderstood classification is that of wrapping paper. Demand for wrapping paper in 1947 increased in line with high industrial activity, but only about the same amount was produced as had been manufactured in 1946. This unfortunately resulted in a very tight supply situation which has continued to the present.

Herein lies the industry's most pressing problem. Before the war, more than 400,000 tons of kraft wrapping paper were produced annually. Only about 300,000 tons were produced in each of the last two years. Today's actual demand is probably close to 450,000 tons per year. This trend away from the production of wrapping paper has been felt by every coarse paper merchant in the country. It has been caused by mills traditionally in the wrapping paper business changing over to the production of converting papers. The latter papers, now in sufficient demand to allow long machine runs and deliverable in large rolls, permit a high degree of operating efficiency for the large, fast-running paper machines. On the other hand, wrapping paper must be made to satisfy the requirements of a multitude of consumers for mixed-lot orders of small diameter rolls and various sized sheets, both in a large variety of weights. As a result, most large mills prefer to produce the converting papers. One solution of this problem may lie with the smaller mills who may come to recognize wrapping paper as a desirable product well within their field of specialization.

The largest group of kraft papers is that used for the production of all kinds of bags and shipping sacks. This use of paper which must actually be spread among several distinct converting industries consumes more than half of all the kraft paper produced. I am not apprehensive about the maintenance or, what is more, the continued growth of this large demand for bag and sack papers in 1948.

The remaining classification is one made up largely of miscellaneous converting grades. It contains all of those grades of paper that are not used for wrapping purposes or made into bags or sacks. The tonnage used by manufacturers of kraft envelopes, sealing tape, waterproof papers, window shades, twine, rugs, and all products made of kraft paper other than bags and sacks is in this classification. These papers are specification papers, each having characteristics peculiar to itself and requiring careful manufacture by the papermaker. Any new use papers would also fall into this classification. The outlook for all of these grades looks favorable for 1948.

The industry is completing the first stage of a mild postwar expansion. This expansion has been the result of long planning and had to await the availability of machines and construction materials. Three new machines were completed and added to the industry in 1947. These new capacities have been absorbed without yet satisfying all of the industry's demands. Furthermore, these capacities were financed without any appreciable financial strain on the industry. As a result, the industry faces the future in good financial condition, with good equipment, and with ready acceptance of its products.

It is always difficult to look into the future. To do so at present seems more difficult than usual. There are more contradictory opinions today concerning the future than in any period in recent years. Government officials, economists and editorial writers contradict themselves and each other repeatedly on the probable trends of business and commodity prices during 1948. However, it is not so difficult to forecast the outlook for the kraft paper industry as to forecast the prospects for American industry as a whole.

With the addition of six new machines promised during 1948, the industry's annual capacity should expand to approximately two and a quarter million tons for the full year. With demand continuing to exceed production, I foresee another record year for 1948. The first few weeks of 1948 already show the industry off to a good start toward such a record. Even though operating full, the industry still is unable to reduce its unfilled orders or increase its inventories. There is no sign of a drastic curtailment in demand for any of the industry's products. Even if there were, other products would undoubtedly take up the slack. It is, therefore, my belief that the kraft paper manufacturers will produce approximately 2,100,000 tons of unbleached kraft paper during the present year.

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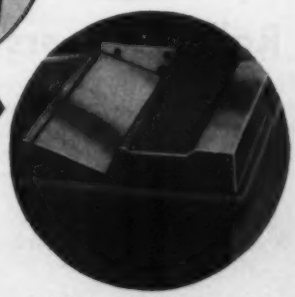

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Position of Paper Industry Summarized*

E. W. TINKER, Executive Secretary
American Paper and Pulp Association

▶▶▶ WITH THE TREMENDOUS growth that has taken place, the pulp and paper industry must recognize the important place it has attained in our domestic economy. While as a manufacturing enterprise the pulp and paper industry ranks sixth among our domestic industries, its well being has a weight in the national welfare far beyond the immediate employment that is offered and its earnings. This is true because its products invade and are essential to every phase of our modern life.

In order to consider intelligently the industry's outlook and the questions involved, it is necessary to review some of its predominant characteristics.

The primary pulp and paper industry employs 198,000 workers. In addition to mill workers 300,000 woods workers are dependent upon pulpwood operations for all or part of their income. Six hundred twenty-four thousand employees are engaged in the printing and publishing industries or in the production of paper products dependent upon the operations of the pulp and paper industry. The importance of this employment of 1,122,000 when measured against total employment in the United States is obvious. Average weekly earning in the primary pulp and paper industry is $53.91 as compared to an all industry average of $48.69.

In the business structure of the country, the pulp and paper industry is a substantial factor with its assets of approximately $3,600,000,000. The industry is unique in that it has the highest capital investment per worker of any manufacturing industry in the country, ($18,500). While the pulp and paper industry long since took its place as the sixth largest of our major industries, the fact that its sales were over $4,000,000,000 last year, which represented over 2½ per cent of sales of all manufacturing organizations is not generally appreciated. Incident to this business, the industry paid some $325,000,000 in taxes.

Last year was considered a good year from the standpoint of profits within the industry. The distribution of the sales dollar is interesting because it reveals how far from a speculative enterprise the pulp and paper industry, over all, has progressed. In fact last year stockholders received in dividends only 2.9 cents of the sales dollar while approximately 8 cents of the same dollar was retained in the business as insurance of the continuity of the enterprise and its jobs and the expansion of the industry to meet requirements. The worker's share of the sales dollar approximated 20 cents or almost 7 times the dividends received by stockholders. The pulp and paper industry has been greatly concerned, not only with increased transportation costs, but with the maintenance of adequate transportation facilities. This is understandable when it is known that the freight bill of the industry involves approximately $500,000,000 per year, or 7 per cent of the entire freight revenue of the railroads.

The pulp and paper industry is becoming a major factor in forest conservation. The tremendous investments required for the establishment of manufacturing facilities and their immobility have made necessary consideration of adequate supplies of wood to give assurance not only of an economically accessible supply, but of a permanent supply. Over 15,000,000 acres of forest land is now in company ownership. Over 90 per cent of this land is being held for permanent production of forest crops. In addition, an intensive educational campaign is being carried on to stimulate good forestry practices upon private land not in company ownership but upon which the industry is dependent. More and more paper companies are actively engaged in engineering their future wood supplies, balancing the cost of wood production under intensive forestry methods within close proximity to plants, against longer hauls with increasing transportation costs. It appears inevitable that the forestry enterprises of the pulp and paper industry will furnish an outstanding example of the solution of a problem of great public interest, as economic conditions permit private enterprise to undertake such a solution. The industry is gravely concerned with local, state and federal government moves that will create an environment unfavorable to private forestry operations.

In the field of international trade, the pulp and paper industry has serious concern. The domestic market for paper in 1947 and for many years before World War II created the greatest volume of dollar exchange of any United States market. The total of all purchases was over $660,000,000 or about 11 per cent of the total dollar volume of all imports in 1947. Newsprint accounted for over $300,000,000 and wood pulp for $220,000,000. These data indicate the vulnerability of the pulp and paper industry to foreign competition. In its recent presentations before the Ways and Means Committee of the House of Representatives and before the Committee on Reciprocity Information, the industry did not attempt to judge the need for dollar exchange on the part of foreign countries or the desirability of international trade agreements. The industry representatives did, however, give a factual picture of the potential effects upon one of the country's major industries which effects upon our national economy can be judged from the facts I have previously outlined. Increasing knowledge of these facts on the part of our statescraft and the general public seems to be highly desirable.

The pulp and paper industry has taken the lead in an attempt to work out understanding and cooperative relationships with administrative agencies of the government. This has been done through the Pulp and Paper Industry Council to the Secretary of Commerce. It is true that because of the pressure of current problems, our consultations with departmental officials up to this time have been largely of a defensive character. It is greatly to be hoped that working through this type of approach, we can obtain governmental understanding of the industry's characteristics, its progress and its difficulties, and in the final analysis develop plans for the industry's orderly development with the full understanding and cooperation of those government agencies that should be concerned with the industry's welfare which obviously coincides with the public welfare.

The consumption of paper and paperboard has been growing faster over a period of years than either the population or industrial production. The consumption of these products, in the year 1947, has reached an all-time high of some 25,000,000 tons or 342 pounds per capita. On the basis of long-time trends, of population growth and increased consumption, we can expect, under good business conditions, a requirement of about 30 million tons by the year 1955. These long-time trends would indicate that domestic production facilities would need to be expanded to an annual capacity of 25,000,000 tons by the year 1955. This involves a healthy growth which no doubt will be affected by the ups and downs of the business cycle and which

(*) From report submitted by Mr. Tinker to Reuben B. Robertson, president of the American Paper and Pulp Association.

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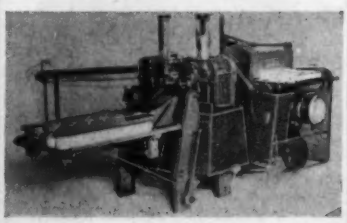

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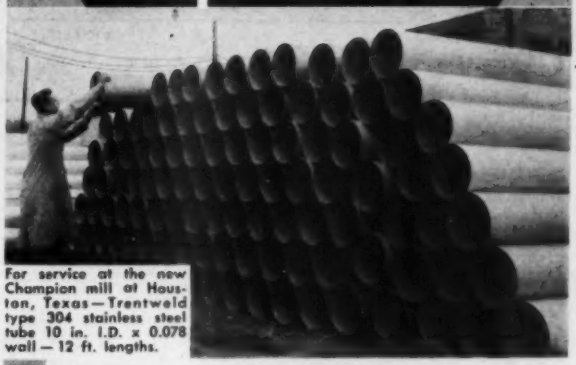

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Convention Papers . . . Abridged

Abridgments in this section are from papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry held in New York City, February 23-26, 1948.

A Pennsylvania Waste White Water Treatment Plant

RODNEY F. COLTART, Sanitary Engineer
Link-Belt Company

The Commonwealth of Pennsylvania has been very active in increasing the tempo of its stream pollution abatement program. Legislation has given the State Sanitary Water Board very broad powers for the enforcement of the present antipollution laws. The amount of construction for waste treatment plants is rapidly increasing today.

Stream pollution abatement, however, is not something relatively new in Pennsylvania, however, since many municipalities and industries have built plants for the treatment of their sewage or industrial wastes. Some municipalities and industries have escaped being required to build treatment plants, only because of the existing condition of the receiving stream, the lack of "know how" as to the most economical method of treatment or by the fact that the abatement program was seriously interrupted by World War II.

I believe it can be stated that Pennsylvania through its classification of streams and treatment program is correcting the first condition, research by chemists and sanitary engineers is developing data to eliminate the second condition, and the third condition is passing out of the picture by the increasing availability of materials, and the stabilization of construction costs.

I stated above that stream pollution abatement was not new to Pennsylvania and at this time, I would like to describe the design and operation of the waste treatment plant at the Beach and Arthur Paper Company at Modena, Pennsylvania.

This paper mill is located on the Brandywine Creek, the source of several public water supplies, and it was essential that a high degree of treatment be provided for the waste water from the plant.

This paper mill began operations in 1937, but the recent war prevented the construction and placing in operation a waste treatment plant until January 1945. The mill at present has an average capacity of 30 tons of product per day and operates on a six-day week. Sixty-five per cent of the total production is on six colors and white manifold and writing paper. The remaining production is on die wipe and napkin papers. Bleached sulphite is the principal pulp used in the manufacture of these papers.

The first step in the treatment program was to reduce to a minimum the amount of waste discharged to the stream. A white water recirculation and control system was installed, so that the foreman would know when surplus white water was being discharged from the system. All surplus white water passes through a 70-mesh cylinder mold type of save-all, before discharge to the waste treatment plant. The solids reclaimed from this save-all contain about 92 per cent moisture and are returned to the stock chest for re-use.

The sources of various waste waters were combined in a common sewer, so that all waste water would be treated before entering the receiving stream. Flow tests showed that 14,000 to 18,000 gal. of waste water were discharged per ton of paper manufactured, and on a 25-ton per day basis, this amounted to 450,000 gal. per day.

Laboratory experiments showed that with proper chemical treatment, a mixing period of 15 minutes and a settling period of 4 hours a satisfactory effluent could be produced. A treatment plant was designed and built on this basis, but increased production to 30 tons per day has increased the flow to 540,000 gal. per day, and reduced the mixing and settling periods to 12.5 min. and 3.2 hr. respectively.

The treatment plant as built consists of a small pump station where the waste water is screened through a ½ in. bar screen, and is elevated about 12 ft. for passage through the treatment plant proper. Dry feed machines are used for feeding alum and soda ash ahead of the centrifugal pump. By adding the chemicals at this point, a flash mix is obtained for thorough dispersion of the chemicals in the waste.

Slide No. 1 is a scale drawing showing the arrangement of the treatment plant which consists of a mixing tank, 5 ft. wide by 5 ft. water depth by 25 ft. long, having a capacity of 4,680 gal. and a settling tank 16 ft. 0 in. wide by 10 ft. average water depth by 60 ft. long having a capacity of 72,000 gallons. The mixing tank is equipped with a horizontal shaft type slow mixer which flocculates the waste and chemicals as they pass through the tank. After flocculation, the wastes enter the settling tank which is equipped with a straight-line type of sludge collector and skimmer.

The sludge collector conveys settled solids along the floor of the settling tank to a hopper at the influent end, where the sludge is withdrawn through a swivel pipe by hydrostatic pressure.

The collector on its upper travel conveys any floating solids to the effluent end of the tank, where they are drawn off through a rotable skimming pipe and discharged into the sludge sump. A float controlled centrifugal pump discharges the sludge to a lagoon. The effluent from the settling tanks passes over multiple weirs before discharge to the Brandywine Creek.

The operation of the plant is practically automatic. The bar screen is cleaned man-

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ually several times per day, and the chemical feeders filled once per day. About 24 ppm of alum and 12 lb. per min. of soda ash are required for adequate treatment. Best results are obtained when a percentage of 6.2 to 6.3 is maintained in the plant effluent. The slow mixers and sludge collector are operated continuously and sludge is withdrawn for a period of about one hour each morning.

When the plant was just placed in operation, the sludge from the settling tank was dewatered on a blanket type save-all which reduced the water content from 96 to 82 per cent. A nearby board mill experimented with trying to reclaim this material, but it was found that the percentage of long fibers was too low and the ash content too high.

With the plant operating at about 115 per cent of its design capacity, the results obtained have met the highest expectations of all concerned. A survey was made by the State Department of Health, and the results show that 92 per cent of the total suspended solids and 90 per cent of the 5-day B.O.D. are removed from the waste white water at the treatment plant. It would not be unreasonable to expect that other plants with wastes of a similar character could reduce their waste to a B.O.D. population equivalent of 30 per ton of product and their volatile suspended solids content to 10 lb. per ton of product. The operating results of the above plant are well within these figures.

In designing new waste treatment facilities, the following points should be considered as essential.

1. Water usage and water wastage in the paper mill should be reduced to a minimum.

2. The waste should be pumped to the treatment plant at as near a constant rate as possible.

3. Chemicals should be flash mixed with the waste followed by 30 min. slow mixing and four hr. settling.

4. The use of reclaimed stock to date has not proven practical.

5. The above design provides a plant that is simple to operate and will produce an excellent effluent.

Acknowledgment—Treatment of waste white water at Beach and Arthur Paper Company by A. W. Redlin and J. J. Gilbert. Published in THE PAPER INDUSTRY AND PAPER WORLD, April, 1946.

A Method for the Determination of the Resistance of Paper and Paperboard to Penetration by Fungi*

B. F. SHEMA, Research Assistant
The Institute of Paper Chemistry

One of the problems during the war years was that of food preservation, especially after packaging. It was apparent that fungi were able to penetrate those paper cartons used in the packaging of food for the armed forces. The cartons dipped in wax were generally quite resistant to the penetration by fungi, if the wax film was continuous. If, however, the wax was cracked, the carton was easily penetrated by various fungi and, therefore, it was highly desirable to have a base material which formed a barrier to the entrance of these various microorganisms. In order to evaluate the penetration of fungi through various paper and paper products,

TABLE 1—The Rate of Penetration of Various Materials by Chaetomium globosum

Test Material	Porosity, sec./100 cc.	Penetration Incubation Period in Days			
		4	7	14	21
Standard blotting paper	3	Moderate	Moderate	Heavy	Heavy
Vegetable parchment	104	Slight	Slight	Heavy	Heavy
"K" ration carton stock	141	Slight	Slight	Heavy	Heavy
Wet wrap	563	Slight	Slight	Heavy	Heavy
Asphalt-impregnated and laminating wrapping	2700	None	None	Moderate	Heavy
Greaseproof board	3600	Slight	Slight	Heavy	Heavy
Waxed glassine	3600	None	None	None*	None*
Coated cellophane	3600	None	None	None	None
Ethylcellulose sheeting	3600	None	None	None	None

* Difficult to determine whether or not very slight penetration had taken place

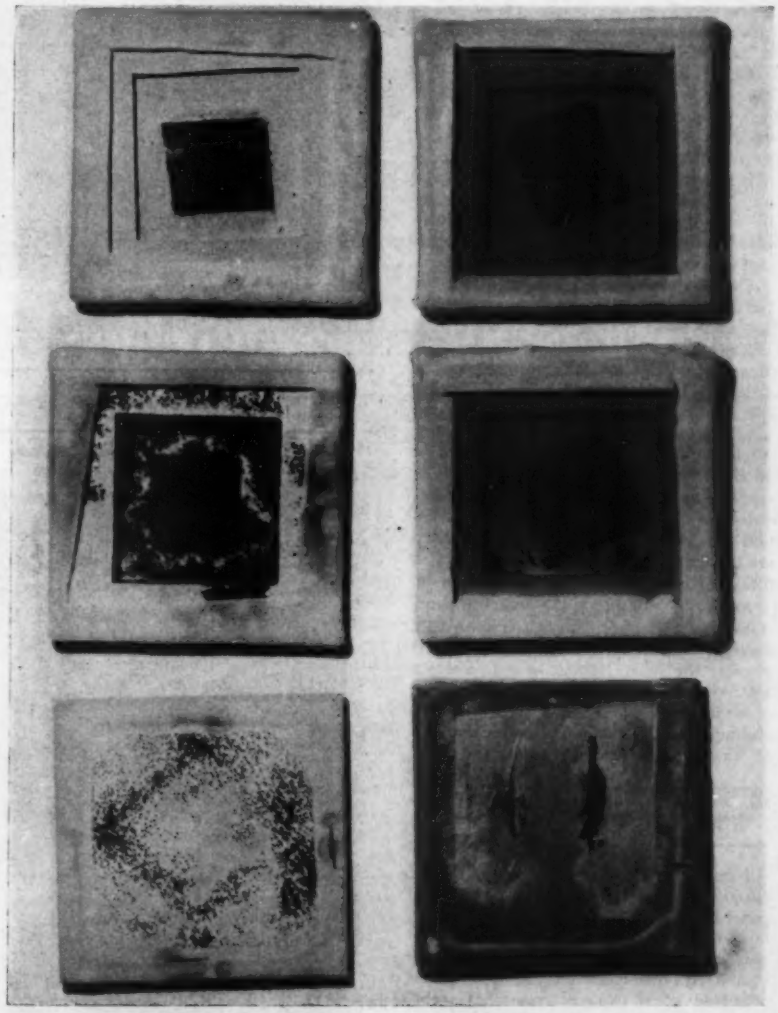


Fig. 1—Method for determination of penetration of fungi through paperboard
Left column: Standard blotting paper Right column: K ration board
Upper row—Immediately after inoculation but using glass plate for top surface to permit observation of growth
Center row—Same as upper row but after two weeks of incubation
Lower row—Penetration through test panel after two weeks incubation

(*) This work was carried out under contract with the Office of the Quartermaster General (W 44-109-QM 305-QMC 44) and is published by permission of the National Research Council and the Office of the Quartermaster General.

it was necessary to develop a satisfactory method. The method, as described is simple and requires a minimum of technical skill.

The paperboard (0.020-0.025 in. thick) is cut into 3.5-in. squares. Four squares are stapled together, a 2-in. square is cut out of the center, and one of the test specimens is stapled onto the assembly. This assembly is placed in a large Petri plate (150 mm.) and cooled to approximately 3 C. in a refrigerator.

Chaetomium globosum is grown in Petri plates on 2 per cent malt agar at 30 C. for 14 days. At the end of this incubation period, the organism should have sporulated over the entire surface.

Fig. 2—Appearance of test assemblies after three weeks incubation with Chaetomium globosum

The inoculum is cut into 1-in. squares with a sterile spatula and placed in the center of the cut out. Immediately after the inoculum is placed in the center of the square (See Figure 1, upper left and right), the assembly is covered with another test specimen (3.5-in. square) and stapled to the assembly. Three edges are then immediately sealed with a hard paraffin (see Figure 1). After the three edges of the test panel are sealed, 1 cc. of nutrient salt broth is added inside the test block and the open edge then sealed.

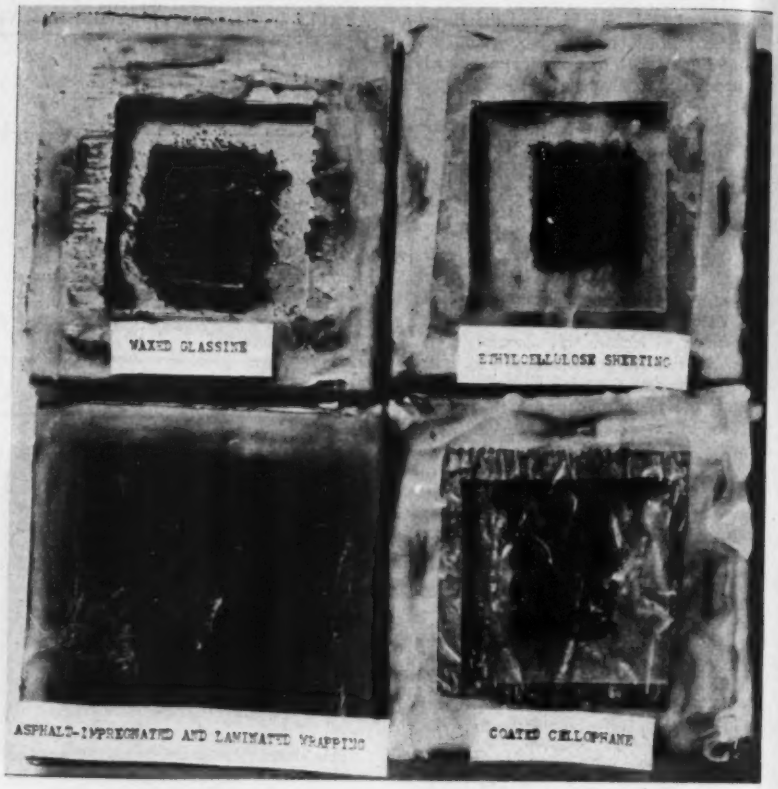
The whole assembly is placed in a large Petri dish (150 mm.) and allowed to incubate at 26-28 C. for 3 weeks.

This method gave excellent results. The fungus penetrated standard blotting paper in 3 days and penetrated through "K" ration board in 7 days. Figure 1 (lower left and right) shows the appearance of the test specimens of the incubate for 2 weeks at 26 C. The method was applied to a wide range of materials. Table 1 shows the penetration of various materials for each incubation period. Also included for comparison are the air permeabilities (or porosities) as measured by TAPPI Standard T 460 m-44.

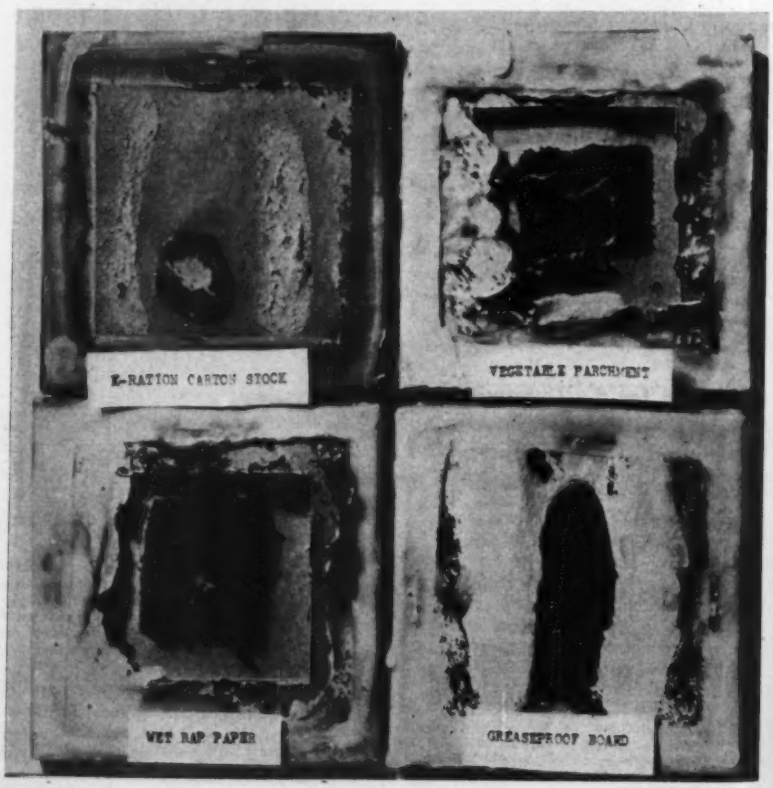
As shown in Table 1, the organism penetrated five of the test materials in four days. Four of these materials are comparatively porous; the other is quite impermeable to air. After 14 days of incubation, six of the nine materials were penetrated by the fungus and no appreciable change was observed after an additional seven days incubation.

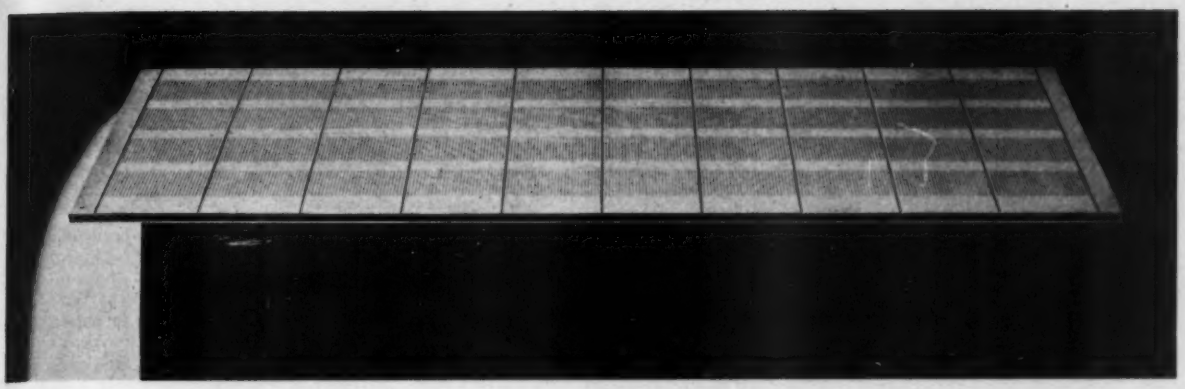
Fig. 3—Appearance of test assemblies after three weeks incubation with Chaetomium globosum

Figures 2 and 3 show the penetration of *Chaetomium globosum* through the test panel after three weeks' incubation. As can be seen in these photographs, vegetable parchment and the wet-wrap paper were completely disintegrated; the test panels crumpled when removed from the incubation chamber. The greaseproof board showed greater penetration than the "K" ration carton stock, even though the former was much more impermeable to air. Asphalt did not form a barrier to the fungus. This may possibly be attributed to the light coating of the asphalt. It was questionable whether or not the fungus penetrated the waxed glassine and no penetration was observed either through the coated cellophane or the ethylcellulose sheeting.



For Table 1 and Figure 1 of Mr. Shema's paper, see preceding page





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The Effect on Pulp Quality of the Stepwise Removal and Replacement of the Hemicelluloses from Aspen Holocellulose

ROBERT EUGENE MARCH
Marinette Paper Company

The investigation of the role that hemicelluloses play in determining the physical properties of pulps includes, by its very nature, work in various other fields. Therefore, for a complete background to the problem, the literature of different allied subjects should be examined. Thorough discussions of the preparation of holocellulose have recently been published (Thomas, Berwyn B., PAPER IND. AND P. WORLD 26: 1281-1284, 1945) (Wise, Louis E., Murphy, Maxine and D'Addieco, Alfred A., *Paper Trade J.* 122, no. 2:35-43, January 10, 1946; *Tech Assoc. Papers* 29:210-218, 1946; Wise, Louis E. and Ratliff, E. K. Anal. Chem., 19:459-462, 1947). Norman (The biochemistry of cellulose, the polyuronides, lignin, etc. Oxford, *Clarendon Press*, 1937. 232 p.) . . . . (Carbohydrates normally associated with cellulose in nature. In Ott, Cellulose and cellulose derivatives, p. 427-446. New York, Interscience Publishers, 1943) . . . . (Hemicelluloses of wood. In Wise, Wood chemistry, p. 252-271. New York, Reinhold, 1944) has summarized most of the work done in the field of the separation, chemistry, and composition of hemicellulose preparations. In 1945, Thomas (PAPER IND. AND PAPER WORLD, 27:1034-1037, 1945) made a complete study of the hemicellulose fractions from aspen holocellulose. Several recent articles cover the use of acidified sodium chlorite solutions for delignifying plant materials (Wise, Louis E., Murphy, Maxine, and D'Addieco, Alfred A., *Paper Trade J.* 122, no. 2:35-43, January 10, 1946; *Tech. Assoc. Papers* 29: 210-218, 1946; Wise, Louis E. and Ratliff, E. K. *Anal. Chem.*, 19:459-462, 1947) (Lovell, Edwin L., *Ind. Eng. Chem.* 37: 1034-1037, 1945) (Jayme G., *Cellulosechem.* 20:43-49, 1942) Sohn, A. W., and Reiff, F., *Papier-Fabr.*, 40:1-7, 105-112, 1942), and the chemistry of sodium chlorite solutions has also been discussed (White, James F., Taylor, Maurice G., and Vincent, George P., *Ind. Eng. Chem.* 34:782-792, 1942) (Holst, Gustaf, *Svensk Papperstidn.* 48:23-30, 1945). Based on the use of sodium chlorite for delignifying wood, Jayme and Finck (*Cellulosechem.* 22:102-114, 1944. Original not available. Unpublished English translation consulted) studied the polysaccharide portion of sprucewood.

In investigating a relationship of this type, three entirely different methods of approach suggest themselves, (1) Pulps from different sources that contain varying amounts of hemicelluloses may be used; (2) To a standard pulp may be added varying

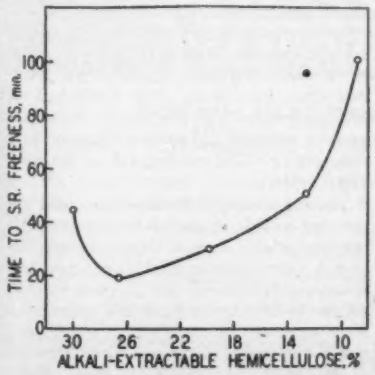

Figure 2

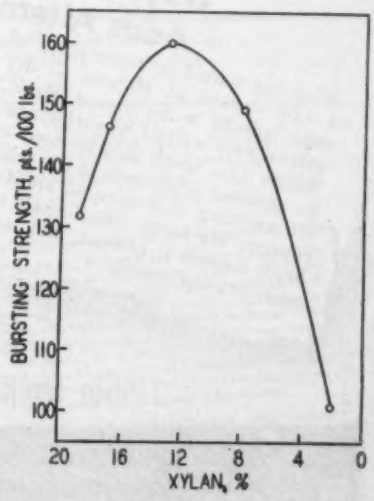

Figure 3

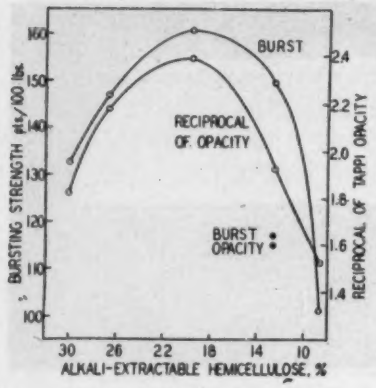

Figure 4

amounts of hemicellulose fractions; (3) A pulp of high hemicellulose content may be subjected to stepwise alkaline extractions, thus producing a series of pulp residues with widely varying hemicellulose contents.

The first method has been used frequently but, in most investigations, the explorations have not been quantitative.

The second method has perhaps been most fully studied but still requires futher investigation. Presumably, hemicellulose, after being separated from pulps, cannot be reintroduced into the fibers in their original form. Chemical and colloidal changes in the extracted hemicelluloses probably occur during their removal and precipitation.

Of the three possible methods of attack, the third appears to be the most logical, and this was the one largely used in the present investigation. If alkaline extractions of the original pulp are made under controlled conditions, this method should give a series of pulps that have different hemicellulose contents but which are otherwise nearly identical. The method appears to be free from the objectionable feature of the second method—that is, the changes in the hemicellulose fractions during their removal and recovery from the unextracted pulp.

The approach to the problem, therefore, would seem to be to use pulps of widely varying hemicellulose content but resembling each other as much as possible in other respects. Recently, acidified sodium chlorite solutions have been used for delignifying wood without the simultaneous removal of the hemicelluloses. This research tool provides a method for investigating the relationship between the hemicellulose content and the pulp quality of wood fibers.

By the use of acidified sodium chlorite solutions, wood could be completely delignified with a minimum loss of polysaccharides. By stepwise alkaline extraction of the holocellulose obtained by the chloriting procedure, it was possible to obtain a series of pulps of widely varying hemicellulose contents. The alkaline extracts, on acidification and addition of alcohol, yielded the extracted hemicelluloses in powdered form. These recovered, dry hemicelluloses could then be added to the various residues obtained and their combined properties studied. From the data for holocellulose, its extracted products, the extracted residues with the hemicelluloses re-added, and a bleached kraft pulp (all from the same wood), a wide range of information concerning the hemicelluloses as related to pulp quality became available. This information led to a hypothesis formulated to explain how the hemicelluloses function in determining pulp quality.

TABLE 5—Chemical Properties of the Fibrous Products (per cent shown)

Product	Alpha-Cellulose,	Acetyl,	Alkali-extractable Hemicellulose,*	Xylan,
Bleached kraft	87.4	—	12.6	18.1
Holocellulose	67.1	3.0	29.9	18.8
0.3% KOH residue	72.2	1.3	26.5	16.9
1% KOH residue	80.1	—	19.9	13.0
4% KOH residue	87.5	—	12.5	8.2
10% KOH residue	91.3	—	8.7	2.1**

* 100% minus % alpha-cellulose minus % acetyl = % alkali-extractable hemicullulose

** Approximately 50% of this xylan was not removed in an alpha-cellulose extraction

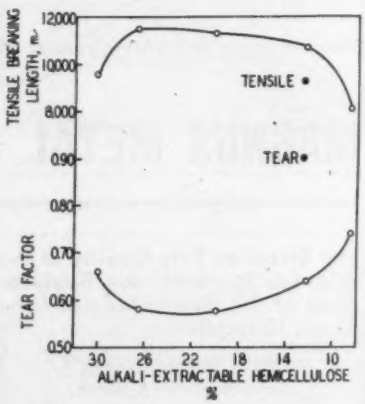

Figure 5

EXPERIMENTAL

Aspen was chosen because of its low lignin and extractive content, its high hemicellulose content, and its relatively slight mannan content. Ten 8-ft. sticks of peeled aspen wood, apparently seasoned for about two years, were used. The wood had an average density of 25.4 lb./cu. ft. (based on ovendry volume) and a growth rate of 13.5 rings per in. The average age of the trees was 38 years.

The extractives of the aspen included 2.9 per cent soluble in alcohol-benzene and 0.5 per cent soluble in cold water. Hemicellulose A (that fraction soluble in 5 per cent potassium hydroxide) and B (that fraction soluble in 24 per cent potassium hydroxide) were separated from chlorited wood meal under nitrogen according to the procedure of Wise, Murphy and D'Addieco (*Paper Trade J.* 122, no. 2:35-43, January 10,

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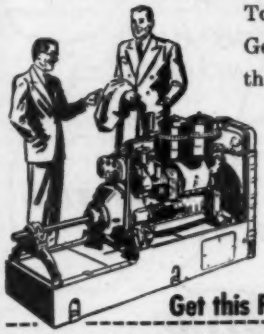

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Past experience in the pulping of woods has demonstrated that there is an optimum chip size which depends upon the pulping process and the wood used. Inasmuch as penetration of liquor into chips is almost entirely in the grain direction, length across the grain is of utmost importance. Therefore, chips ¼, ½, and ¾ in. in length along the grain and with typical cross and tangential dimensions were prepared by hand for the purpose of evaluating the effect of chip size in chloriting. At 80 C. and atmospheric pressure the chloriting liquor caused delignification of the chip up to a distance of ⅛ to 3/16 in. from either end. Thus, under normal conditions, complete delignification of chips ¼ to ⅜ in. long was readily effected within 5 hours with the use of 100 to 150 per cent of sodium chlorite (calculated on the ovendry wood). Longer chips, chlorited under these conditions, showed a distinct lignin-containing zone in the center of the chip (as demonstrated by a hard, unbleached core, in contrast to the soft, easily defibered, bleached edges).

Preparation of Holocellulose

Approximately 19 liters of hot tap water were heated in a 30-liter Pyrex battery jar with direct steam to a temperature of 84±1 C.; 90 cc. of glacial acetic acid were added and thoroughly mixed with the water, followed by about 2600 grams of aspen chips (15 per cent moisture). Subsequently, a solution of 900 grams of technical sodium chlorite in a liter of the hot acidified water was poured into the jar and the mixture was agitated thoroughly. A weighted porcelain plate was used to maintain chip submergence in the chloriting liquor (*p*H of 5.0± 0.2). The battery jar was placed on a steam bath and the temperature of the mixture was maintained at 81±2 C.

At the end of 75, 150, and 225 minutes, the additions of acetic acid and sodium chlorite were repeated. The liquor and chips were agitated thoroughly every half hour.

After a period of six hours, the liquor was drained from the delignified chips, which were washed with fresh water three or four times. After the excess chlorite had been partially removed, the softened chips were placed in a glass-lined pulp mixer and subjected to a mild mechanical action at a consistency of 8 to 10 per cent for one-half hour. This mechanical treatment defibered the delignified chips.

Three additional water washes, including an overnight diffusion period in fresh tap water at about 2 per cent consistency, gave a satisfactory holocellulose preparation (ash content of 1 per cent). The product was pressed to approximately 20 per cent ovendry consistency and stored in air-tight bottles.

The use of such a high percentage of chlorite under these conditions gave rise to an "overchlorited" pulp residue. Some of the "labile" hemicelluloses (i. e., approximately one-third of the uronic anhydride, acetyl, and xylan) were lost in the chloriting process, as well as 8.8 per cent of the alkali-resistant cellulose. However, for the purposes of this investigation, complete delignification was more desirable than was the retention of the more easily removed hemicelluloses. The theoretical holocellulose yield is 81.2 per cent, whereas the actual "holocellulose yield" obtained was 69.8 per cent (extractive-free basis). (In the following sections the term "holocellulose" refers to this residue.)

Alkaline Extraction of the Holocellulose

The holocellulose was extracted with 0.3 per cent potassium hydroxide for 2 hours at 22±1 C. and 10 per cent consistency. This treatment removed 5.8 per cent of the material. At the end of the 2-hour extraction period, the residue was pressed to recover as much of the liquor as possible. Subsequently, the pulp was washed with water, dilute acetic acid and, finally, several times with water. Approximately 50 per cent of the extraction liquor was recovered in each of the alkali extractions. In each case, the liquor was acidified with glacial acetic acid and the hemicelluloses were precipitated by the addition of 2.5 volumes of ethyl alcohol. After settling several days, the supernatant liquid was decanted and the hemicelluloses were separated by centrifuging. They were washed three times with absolute ethanol, once with absolute ether, and ground to pass a 50-mesh screen.

Three aliquot portions of the 0.3 per cent KOH residue were extracted, respectively, with 1, 4, and 10 per cent potassium hydroxide for 1 hour at 22±1 C. and 10

per cent consistency. The amounts extracted from the 0.3 per cent KOH residue by 1, 4 and 10 per cent potassium hydroxide were, respectively 9.3, 16.7, and 23.0 per cent. In each case the extracted hemicelluloses were recovered as described above.

Addition of the Hemicellulose Fractions to the Extracted Fibrous Residues

Based on the xylan content of the respective residue and the hemicellulose, the amounts of hemicellulose and residue were calculated to give a total of 24 grams of ovendry material (one ball mill charge), which had the same xylan content as the pulp from which the residue and hemicellulose were obtained. The required amount of the residue was given the usual disintegration, thickened on a Buchner funnel, and suspended in water in the ball mill to give a final consistency of 3 per cent. The calculated amount of dry, ground hemicellulose was carefully dusted in so that agglomeration of the hemicellulose particles would be minimized. The Lampén ball mill was closed and beating was carried out in the usual manner.

For each of the four residues and their respective hemicelluloses, a three-point beating curve was obtained. In addition to these data, a single median beating time was used in ball milling a sample of each of the residues. To each of these beaten pulps, the same amount of dry hemicellulose was added as in the above cases. The pulps were then given a further 5-min. ball milling to disperse the hemicellulose. In all cases, handsheets were prepared and tested.

Depending upon whether hemicelluloses are contained within the fibers or are outside of the fibers, the conditions for hydration and fibrillation of fibers in water appear to be entirely different.

Holocellulose and the Extracted Fibrous Residues

Tables 5 and 6 summarize the data plotted in Figures 2 to 7.

Figures 2 to 7 illustrate different properties of the holocellulose and its extracted fibrous products; these are compared with the corresponding property of the bleached kraft pulp.

Time to 500 S.-R. Freeness vs. Percentage of Alkali-extractable Hemicellulose (Figure 2)

The curve passed through a minimum when the pulp retained 26-27 per cent alkali-extractable hemicellulose (0.3 per cent KOH, residue). Under normal conditions, the rate of beating should increase as the hemicellulose content of the fibers increases (the ability of fibers to swell and hydrate would increase). However, in this case there was apparently an optimum hemicellulose content at which the rate of beating was greatest. The following possible reasons are advanced for this apparent paradox.

(a) The specific surface data indicated that the original holocellulose and the 0.3 per cent KOH residue had nearly the same area per unit weight and, therefore, the two products were swollen to approximately the same extent.

(b) Twenty per cent of the recovered 0.3 per cent hemicellulose were unaccounted for by analysis. The character of this 20 per cent is unknown but it is conceivable that it cemented the holocellulose fibers together so that they were more difficult to beat.

On the basis of an alkali-extractable hemicellulose content of 12.6 per cent, the development time of 95 min. to 500 S.-R. freeness for the bleached kraft pulp agreed reasonably well with the data for the extracted holocellulose residues. Hydration of bleached kraft pulp was similar to that of the 10 per cent KOH residue.

Bursting Strength at 500 S.-R. Freeness vs. Percentage of Xylan (Figure 3)

The curve passed through a maximum when the pulp contained about 13 per cent xylan (1 per cent KOH residue). The bleached kraft pulp, however, with its xylan content of 18.1 per cent did not approach the curve. The analytical data on the kraft pulp showed that, although it contained 18.1 per cent xylan by analysis, only 50 per cent of this xylan was extracted in the procedure used in the alpha-cellulose determination. Therefore, the unextracted xylan in the kraft pulp did not behave as a typical hemicellulose insofar as bursting strength was concerned.

Bursting Strength and Reciprocal of TAPPI Opacity at 500 S.-R. Freeness vs. Percentage of Alkali-extractable Hemicelluloses (Figure 4)

It is evident that, when bursting strength was plotted against the percentage of alkali-extractable hemicelluloses rather than against the percentage of xylan, the bleached kraft

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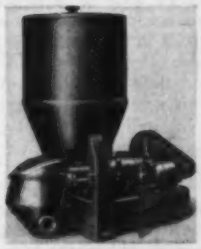

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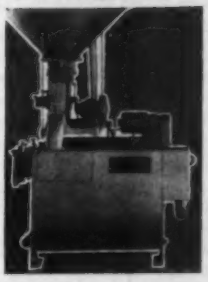

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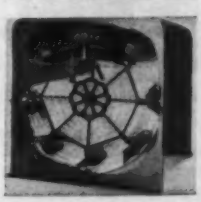

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TABLE 6—Physical Properties of the Fibrous Products at 500 S.-R. Freeness

Product	Bursting Strength, pts./100 lb.	Tear Factor	Tensile Breaking Length, m.	TAPPI Opacity, per cent	Reciprocal of TAPPI Opacity	Time to 500 S.-R. Freeness, min.	Specific Surface,* sq. cm./g.
Bleached kraft	117	0.90	9,170	62	1.61	95	15,700
Holocellulose	132	0.66	9,450	55	1.82	44	22,300
0.3% KOH residue	146	0.58	11,400	46	2.18	19	22,000
1% KOH residue	160	0.58	11,200	42	2.38	30	18,800
4% KOH residue	149	0.64	10,600	52	1.92	50	13,900
10% KOH residue	101	0.74	8,000	66	1.52	100	16,700

*Measured on the unbeaten fibers

data fitted more satisfactorily into the over-all picture of the effect of hemicellulose on pulp quality.

The bursting strength of paper is considered to be, in part, a measure of the bonding strength between the fibers. Likewise, as the opacity of paper decreases (for the same type of wood and pulping process), the amount of bonding between fibers probably increases and there are more optical contacts between the fibers. This results in a larger bonded area between the fibers. Therefore, the reciprocal of TAPPI opacity should also be a direct measure of the amount of interfiber bonding. The two curves in Figure 4 show a maximum at the same "extractable hemicellulose content" and their general shapes are very similar. This was confirmatory evidence that there is a hemicellulose content of the fibers which may be correlated with a maximum bonding action between the fibers.

The reciprocal of the TAPPI opacity for the bleached kraft pulp fitted quite well into the over-all picture of extractable hemicelluloses versus opacity of paper.

Tensile and Tearing Strengths at 500 S.-R. Freeness vs. Percentage of Alkali-extractable Hemicelluloses (Figure 5)

The tensile strength curve showed a maximum when the pulp retained 26-27 per cent alkali-extractable hemicelluloses. However, the tensile strength for the range of 16 to 28 per cent extractable hemicelluloses showed only about 5 per cent difference between the highest and lowest values obtained. Beyond this range, there was a rapid strength decrease.

The tear curve showed a minimum within the range of 22 to 26 per cent alkali-extractable hemicelluloses. It is probable that, with fibers of the same length, tearing strength generally decreases with increased fiber-to-fiber bonding. Thus, the three physical tests—tear, burst, and opacity—all indicated that there was a maximum bonding when the pulp retained extractable hemicelluloses.

The tearing strength of the bleached kraft was much higher than that of the holocellulose or any of its extracted products. Apparently, the interfiber bonding of the kraft pulp was of such a character that a high percentage of the fibers were pulled apart rather than broken into two segments.

Specific Surface of Unbeaten Fibers vs. Percentage of Alkali-extractable Hemicellulose (Figure 6)

The very rapid decrease in the surface area of the fibers (on a unit weight basis) between 27 and 13 per cent alkali-extractable hemicellulose demonstrated the higher swelling capacity of the hemicelluloses when compared with that of cellulose. Below a 12 per cent hemicellulose content, the surface area per gram of fibers increased. This increase was probably due in part to the irreversible swelling of the fibers in the 10 per cent potassium hydroxide extraction. The surface area per gram of the bleached kraft pulp was about 10 per cent higher than that shown by the curve for the same hemicellulose content. However, inasmuch as the accuracy of the specific surface procedure is about ±5 per cent, the area of the kraft fibers was not at great variance with the other data.

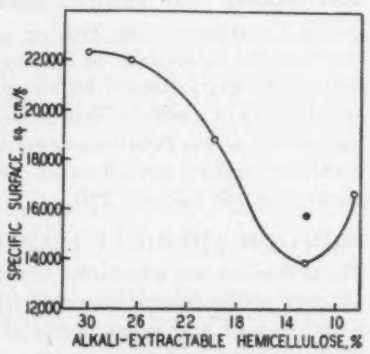

Figure 6

Bursting Strength at 500 S.-R. Freeness vs. Percentage of Xylan in Paper (Figure 7)

Comparison of the two curves in Figure 7 indicated that the addition of dry hemicelluloses improved the bursting strength of the residues. In the cases of the 0.3, 1, and 4 per cent KOH residues with hemicelluloses added, all three pulps were very close to the maximum bursting strength (160 points/100 lb.) obtained on the 1 per cent KOH residue. This was somewhat unexpected in the case of the 0.3 per cent KOH residue. Addition of 0.3 per cent KOH hemicellulose to this residue might well have decreased its bursting strength. However, there was actually a 10 per cent increase in the bursting strength with the hemicellulose added. These results indicate that the 0.3 per cent KOH hemicellulose fraction was beneficial in its action on beating but detrimental to strength when present in the final paper. The addition of 26 per cent of the 10 per cent KOH hemicellulose to the 10 per cent KOH residue increased the bursting strength by 16 per cent as compared with that of the residue itself. However, on the basis of percentage of xylan actually present in the finished paper, the 10 per cent KOH residue with added hemicellulose was slightly lower in bursting strength than the value indicated by the curve for the residue.

The effect on the tearing strength of the addition of hemicelluloses to their fibrous

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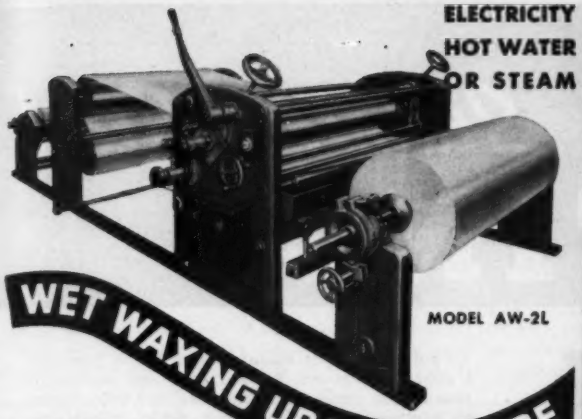

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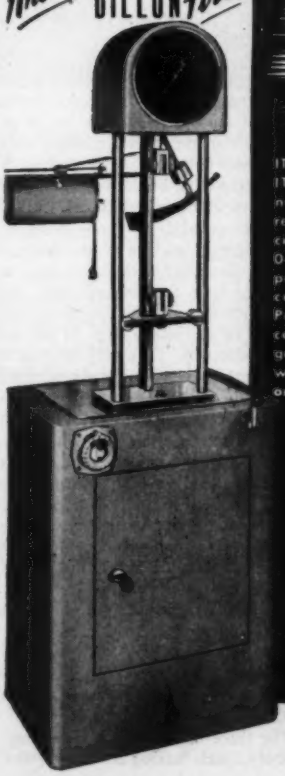

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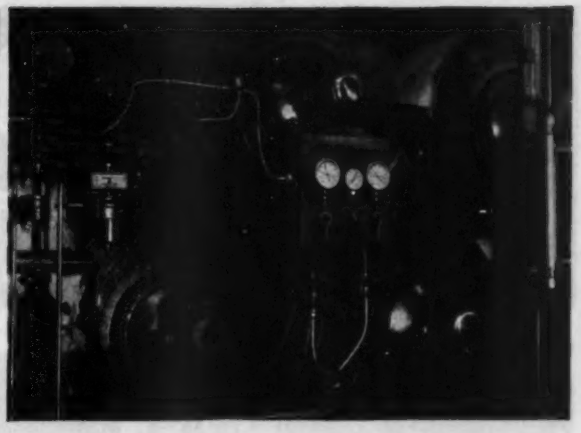

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residues was not significant. In some cases, the tear factor increased slightly, whereas in others there was a small decrease. It was concluded, therefore, that the addition of dry hemicellulose to pulps had little or no effect on the tearing strength.

The comparison between adding hemicellulose before and after beating showed the following trend: The addition of the dry hemicellulose before beating increased the bursting strength and accelerated the rate of beating slightly. The addition of hemicellulose after most of the beating had been carried out resulted in a loss in bursting strength and no change in the rate of beating. (The latter would be the expected result.) Apparently the hemicelluloses added after beating behaved in the paper as inert fillers by decreasing the bonding strength between the fibers.

The addition of 150 per cent of the 10 per cent KOH hemicellulose to the 10 per cent KOH residue before beating resulted in a paper with a xylan content of 8.2 per cent. However, the bursting strength of the paper was about the same as that of the residue itself. This was a further indication that increasing the xylan (or hemicellulose) content of a paper by the addition of a dry hemicellulose preparation of the type prepared in this study did not increase the strength of the paper.

Apparently the addition of hemicelluloses in small amounts to pulps (particularly to pulps originally low in hemicelluloses) increases their bursting strength. However, if hemicelluloses are added in a quantity or by a procedure which would increase the hemicellulose content of the sheet too greatly, no increase in strength occurs. These experiments point to an optimum hemicellulose content.

The swelling capacity of fibers has been shown to be directly proportional to their hemicellulose content. However, when the hemicellulose is exterior to the fibers, the swelling capacity of the latter would be unchanged, regardless of the amount of hemicellulose present. As a result, the two types of systems would not be expected to behave alike in papermaking processes. The data obtained demonstrate that this is the case.

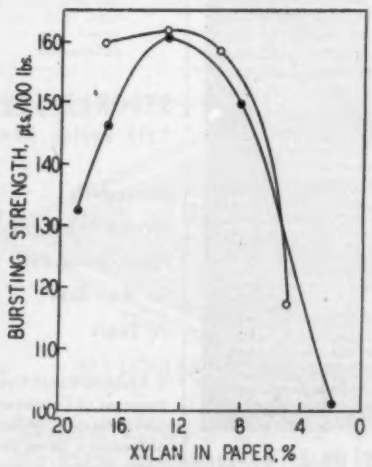

Figure 7

Under the conditions used, the re-addition of extracted hemicelluloses did not give a pulp with properties similar to those of the unextracted material.

SUMMARY

1. An essentially lignin-free holocellulose was prepared from aspen chips in 70 per cent yield by the use of hot acidified solutions of sodium chlorite.

2. On testing the holocellulose and its alkali-extracted fibrous products, the following facts were noted:

(a) The specific surface of the fibers in water rapidly decreased as the hemicelluloses were extracted from the holocellulose. Finally, pulp with 91 per cent alpha-cellulose was obtained by extraction with 10 per cent potassium hydroxide. This pulp showed an increase in surface area which was probably the result of the irreversible swelling of the fibers by the strong alkali. The decrease in specific surface of the fibers with lower hemicellulose contents indicated the high degree of swelling exhibited by hemicelluloses.

(b) The bursting strength of paper made from the various products showed a definite maximum at a xylan content of 13.0 per cent or an "alkali-extractable hemicellulose content" of 19.9 per cent.

(c) The opacity passed through a minimum at an alkali-extractable content of 19.9 per cent.

(d) Tearing strength was a minimum at an extractable hemicellulose content of 20 to 25 per cent.

(e) The three physical properties—opacity, bursting, and tearing strengths—indi-

cated that there was maximum bonding between the fibers at an alkali-extractable hemicellulose content of about 20 per cent.

(f) The rate of beating was most rapid at an alkali-extractable hemicellulose content of about 26.5 per cent.

3. Comparison of the holocellulose and its alkali-extracted residues with a three-stage bleached kraft pulp from the same aspen wood showed the following:

(a) With the exception of the residue after 10 per cent KOH extraction, the holocellulose and its extracted residues had a much higher bursting strength than did the bleached kraft pulp.

(b) The tearing resistance of the bleached kraft was much higher than that of the holocellulose or any of its products.

(c) On a xylan content basis, the properties of the bleached kraft pulp could not be correlated with those of holocellulose and its alkali-extracted residues. However, on an alkali-extractable hemicellulose basis, the data from the kraft pulp correlated well with the papermaking qualities shown by the holocellulose and its products. It is suggested that, instead of basing the relationships of hemicellulose content to pulp properties on only one component of the hemicellulose, the basis for comparison should be the total alkali-extractable hemicellulose content.

4. The introduction of the extracted hemicelluloses into their respective residues gave the following results:

(a) The addition of the dry hemicelluloses (5 to 25 per cent) directly to the fibrous residues in the Lampén ball mill before beating resulted in slight increases in bursting strength over those values obtained for the untreated fibrous residues. Slightly faster beating was observed in the cases of the 4 and 10 per cent KOH residues on the addition of the corresponding hemicellulose preparations. However, retention of the hemicellulose by this procedure was low (0 to 20 per cent of the amount added).

(b) The addition of the dry hemicellulose preparations to the respective fibrous residues after most of the beating had been carried out on the residues resulted in bursting strength losses.

(c) In one experiment, the addition of 150 per cent hemicellulose to the 10 per cent KOH residue before beating resulted in very little improvement in bursting strength over that of the residue alone, despite the fact that the xylan content of the paper was increased from 2.1 to 8.2 per cent.

(d) From these data, it was concluded that the addition of small amounts (5 to 25 per cent) of dry hemicellulose preparations to pulps increased the bursting strength of the pulp by as much as 20 per cent. However, the addition of very large quantities of hemicelluloses to pulps did not result in an improvement of their strength properties.

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Warren Steam Pump Company, Inc., Warren, Massachusetts

Industrial Training at Union Bag and Paper Corporation, Savannah, Georgia

J. H. GROVES, Training Director
Union Bag and Paper Corporation

Training is the systematic formation of habits of thoughts and action. The field of industrial training, as it is recognized at the Savannah plant of Union Bag and Paper Corporation, includes any individual or group instruction, given at any level by any agency, that will contribute to the further development of the intelligence and skill with which the individual employee, either supervisory or nonsupervisory, performs his duties.

The training needs at any plant are created by the usual industrial occurrences of new employment, turnover, necessity for versatility, promotions, introduction of machines and equipment of new design, development of new methods and new products, increased quality and quantity requirements, legislation and agreements affecting employer-employee relations, and other factors. At Savannah these needs have been accentuated by the rapid plant expansion, by the diversification of products, and by the inexperience of most of the new employees.

Union Bag's Savannah operations began in the summer of 1936 as a one-unit pulp and paper mill and a small grocery bag factory. The operations now consist of a five-unit pulp and paper mill with a daily output of eleven hundred tons of kraft paper and board and some processing of creped and waxed papers; a bag factory producing daily thirty million bags in a wide range of standard, special, and multiwall constructions; and a two-unit box plant turning out a variety of corrugated shipping containers; all augmented by technical, industrial relations, and administrative and accounting divisions. Employment has increased from seven hundred in 1936 to the present total

of 4,600 including twelve hundred women.

While employment has leveled off with the recent attainment of immediate postwar expansion plans, diversification of products will continue to be required by new developments in special papers, bags and boxes.

In the spring of 1944 a training department was established to implement and coordinate an expanded program for training employees of the Savannah plant. This was a considered step, taken by a management faced by increasing wartime difficulties of maintaining an efficient working force, to realize still further upon the benefits that had accrued from occasional participation in federally-sponsored war training procedures, from previous actions taken to improve the training of new employees in the bag division, and from the traditional pulp and paper mill job instruction.

The training department consists of two men, with the director reporting to the industrial relations manager. While the training staff has had some experience in the direct supervision of instructors and trainees in two production departments, it now operates, except for the conducting of instructor training and supervisory conferences, entirely in a staff capacity.

Operation of the Savannah training program is a co-operative venture between line supervision and the training staff. Line supervision has the primary responsibility of training its men or seeing that they are trained; the training staff has the responsibility of giving technical assistance to line supervision in the formulation and operation of effective instruction.

From the first, those responsible for the establishment and operation of this activity have had in mind the ultimate installation of a comprehensive, plant-wide program in the closely related and often overlapping fields of job, trade extension, and supervisory training. The exigencies of war, however, required for some time almost undivided attention to the initial training of the tremendous influx of inexperienced workers necessary to keep going essential production, and only in the past eighteen months has it been possible to devote any appreciable attention to the further training of more experienced workers and of supervisors.

Job training is that day-to-day instruction given during working hours on the production floor, at the bench, at the desk, and at any other working place, for the purpose of initial breaking-in on the job, improvement on the job, and preparation for the job ahead. In some form or other, every industrial employee receives job instruction daily; the supervisor, and often the skilled worker, also gives job instruction daily.

Efforts in this field at Savannah have been devoted principally to improving the instruction of new employees. There has been developed an induction period, through which all new employees pass when first reporting to work, and which is intended to give them certain basic information, and to condition them to some degree for entrance upon Union Bag employment and for the development of proper work habits and desirable attitudes. With the realization of the importance of the immediate and effective development of these habits and attitudes in the newcomer, some additional instructional plans have been developed with, and some training in instructional methods given to, those performing the well-established traditional pulp and paper mill job training; in the bag division, instructional plans and outlines have been developed and instructors have been selected and trained; and in the box division instructional plans have been prepared and supervisors and skilled workers trained to act as instructors.

To a smaller extent similar efforts have been made to improve the job training that occurs after the breaking-in period is over. This process of learning, often referred to as "getting experience," leads to improved performance and promotion. It seldom receives the attention that is devoted to training for beginning jobs, although it is only too true that, unless there is some use of good instructional procedure, the employee getting experience is often only practicing repeatedly his own mistakes and those of others.

The use of trade extension training is receiving increased attention at Savannah as a means of more rapidly and completely developing the skills and attitudes of both supervisory and nonsupervisory employees. Designed to supplement job experience, and to extend occupational knowledge and skill, this type of instruction is given through organized courses taught at the plant, single meetings held at the plant, courses offered at local educational institutions, and correspondence.

In some organized classes, operated entirely by the Company, particularly those given in connection with a special job training effort, attendance is required although the meetings are held after work hours.

The leading extension training activity at the plant, however, consists of organized leisure-time courses, in which participation, although it may be encouraged, remains strictly voluntary.

Blueprint reading for maintenance mechanics and helpers is given once or twice each year in two units of approximately twenty hours each. The first unit covers basic instruction in the interpretation of conventional lines, views, scales, dimensions, full and half-section views, notations, and symbols; while the second unit is devoted to practice in reading actual prints used in the departments in which the students are employed.

Two short courses in electronics were given recently as a result of the increased use of electronic register controls on bag machines, and of the installation of a new paper machine with electronic speed regulation. The first unit, given for both mill and bag division electricians, consisted of a study of electronic tubes and their action in electrical circuits. The second unit, given to mill division electricians, was a further study of the electronic controls on the new paper machine. Part of this latter study was conducted while the equipment was being installed and the remainder after it had been placed in operation, so that questions arising from the operation could be considered.

Other subjects that have been taught at various times include combustion, shop mathematics, elementary mechanics, pipe layout, theory of bag compensation and principles of register control; and use of the slide rule.

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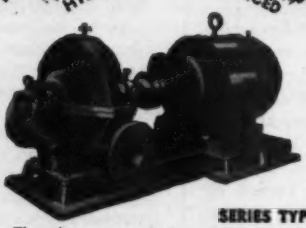

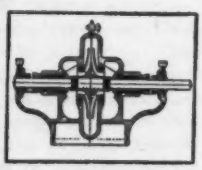

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These voluntarily attended courses are organized as the result of requests from supervisors and from workers, or from the determination of need by other means. They are open to all employees whose occupations are related to the subjects being taught and who are interested in attending. There is no cost to the students other than the purchase of any required texts or other material, sold to them at cost through the store room.

These courses are given in short units of from fifteen to thirty or forty hours, with one or two two-hour classes per week held immediately before or after shift change. These practices are followed because of the employed adult's preference for leisure-time training in compact form, and also to facilitate attendance, since no employees live within walking distance of the plant.

Instructors for trade extension courses at the plant are selected from occupational qualified plant personnel and are trained and supervised by the training staff. The lone exception to the use of plant personnel has been the visiting installation expert who consented to conduct the extension training on paper machine electronic controls. Engineering, Science and Management War Training, working through the Georgia School of Technology, assisted in the combustion training; and the Savannah Vocational School, aided by state and federal vocational education funds, has assisted in the blueprint, shop mathematics, pipe layout, and elementary mechanics courses. All other trade extension classes at the plant have been conducted entirely by the plant personnel.

A less thorough trade extension activity is the holding of single meetings on specific subjects at the plant. These meetings, usually informational in nature, and held either during or just after work hours, with voluntary or required attendance as desired, are most often conducted by representatives of equipment manufacturers and occasionally by plant personnel. The subjects are presented through films, discussions, or a combination of both. Among the subjects presented during the past year were operation and care of typewriters and calculators, telephone courtesy, gas and oil firing of boilers, antifriction bearings, arc welding, and operation and care of electric trucks. A short course in filing given downtown by an office supply firm was utilized recently to good advantage.

During 1947 the total enrollment in the organized trade extension courses at the plant was 434, and the total attendance at single meetings on various subjects was 856.

The changing conditions at Savannah which were outlined earlier have intensified the need for developing in the supervisory force additional knowledge and skill in both the technical and the human relations phases of the supervisory job. In addition to the job and trade extension training, which contribute principally to development in the technical phase, the Savannah plant operates, through the conference procedure, training designed for further development of the supervisor's human relations ability.

The objectives of the supervisory conferences are first, to develop or to further emphasize the supervisory point of view—that is, the realization by the supervisor that his thoughts and actions must be directed towards establishing and maintaining the efficiency of those people through whose efforts he obtains his results, and for whose performance he is accountable to those higher in authority; and second, to assist the supervisor in formulating ways and means of discharging his responsibilities from this point of view.

The conferences are conducted in series of ten meetings of one and one-half hours each, held usually once or twice each week on company time, and attended by groups of from eight to fifteen supervisors of approximately equal rank in the organization. Conference leaders are selected from the training staff and from top supervisors, all of whom have been trained in the conference procedure.

The topics discussed to date include supervisory duties, leadership, giving orders, discipline, information the supervisor should have about his men, worker inefficiency, safety, and job training. The subject matter is developed from the experiences of the group through the exchange of ideas and information and, consequently, the group members actually instruct each other. In all discussions emphasis is placed on the supervisor's definite responsibility in all matters affecting the work of his employees. The analysis of any specific problem is made through the determination of the actual underlying cause, as expressed in terms of human failure; and the determination of what the supervisor can do with or for the person responsible in correcting the situation and in eliminating or reducing the probability of its recurrence.

Of the approximately two hundred fifty supervisors at Savannah, one hundred twenty participated in one series of conferences during 1947, bringing to two hundred the number that have taken part to date.

Essential Principles

In carrying out the activities just reviewed, every effort is made to adhere to certain essential principles upon which any industrial training program depends for successful operation and for obtaining maximum results. Briefly, these essentials include:

1. Recognition, voluntarily or otherwise, by the supervisors of those to be trained that there exists a need for improvement of the individual that can be met by specific training. Requests for training assistance are often received from supervisors, but the training staff does not hesitate to call to supervisory attention any indication of needs.

2. Recognition by the prospective trainee, particularly when voluntary attendance is involved, that he needs and probably will benefit from training. Care must be taken, however, to avoid creating any erroneous impressions regarding immediate advancement as a result of his participation.

3. Carrying on of all training as far as possible by the employees' line supervisors. Certainly, the supervisors must direct, and often give, training on the job; they also must be in accord with the offering of all other training, and are the greatest source of occupationally qualified trade extension instructors and conference leaders.

4. Use of authentic training content that

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is specifically applicable to the needs of the individual. The supervisors concerned, the prospective instructors, and often other skilled workers, should participate in the development of instructional material at the plant, and in the selection of any readily available texts and other material.

5. Use of carefully selected and trained instructors and conference leaders. Although selected on the basis of recognized occupational proficiency, leadership, patience, willingness to help others, and other factors, these people must have or acquire the mastery of the elements of good instruction or good conference leading. It is generally true that the successful supervisor has already developed in himself many of the essentials of good instruction, although often he is not aware that they are teaching fundamentals.

6. Treatment of the person being trained as an employed adult, and not as an adolescent schoolboy.

7. Placement of emphasis on mastery of the subject, rather than on the time spent in training. In trade extension classes this calls for individual instruction, as a means of caring for the pronounced individual differences found in industrial groups.

8. Satisfaction of the human desire for recognition of achievement. Those who meet established standards of participation and performance in trade extension and supervisory training at the Savannah plant receive appropriate certificates, which are signed by the resident manager and the training director, delivered by the division manager or another top supervisor, and frequently publicized in the magazine issued by the employees.

9. Permanent recording of individual performance in training activities, as a matter of justice to both employer and employee at times when individual records are reviewed. At Savannah all performances, good or bad, in trade extension and supervisory training at the plant, together with such similar information as is received from outside institutions, are reported to supervision and also become a part of the individual's permanent personnel record.

Abridgments in this section are from papers presented at the annual meeting of The American Pulp and Paper Mill Superintendents Association, held at the Edgewater Beach Hotel, Chicago, May 22, 23, and 24, 1947

High Density Pumping and Pulping

T. AGRONIN
In Charge of Engineering
Shartle Brothers Machine Co.

Paper stock at high consistencies will only flow by gravity to a pump impeller. A large suction tends to introduce less friction loss and, therefore, stock will flow more rapidly to the impeller. We have a number of sizes of pump suctions for each size pump, depending upon the operating conditions. However, for high consistency stock, we use the largest suction possible. We have developed what we call a super-suction casing.

For standard round suction, we use inlets as large as 16 or 18 in. in diameter for say 6 in. pumps.

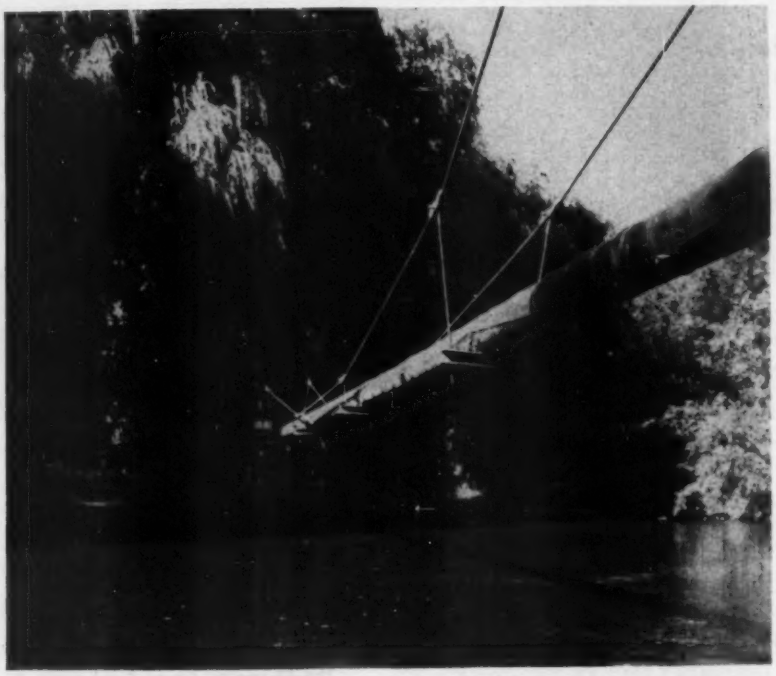
The super-suction casing is much larger in area and can be used on any size pump which we build. The super-suction casing has a built-in slide valve and is grouted directly into the chest wall.

A vertical suction is used in some installations. A vertical suction allows the release of air from the suction back into the chest in order to insure that the stock will flow to the pump.

Paper stocks at high consistency have to be agitated in order to produce an even consistency. This is especially true of kraft stocks which are free, in addition to being of high consistency. We, therefore, install what is known as a breaker impeller in the suction of the pump. This breaker impeller is a two-arm impeller which tends to agitate and even out the stock consistency. This is a very important factor in handling high consistency stock.

High consistency stock usually has considerable entrained air in it. Therefore, when it is agitated by the breaker impeller, the air had a tendency to be released, forming large air-bubbles causing airbinding. It is thus necessary to sometimes install a vertical vent in a horizontal suction of a high consistency pump in order to allow the air to be released, or, use a vertical suction.

Once we even out the consistency, we make sure that the stock reaches the im-



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peller by the installation of a feeder (or booster) impeller, as it is known, between the breaker and centrifugal impeller. This booster impeller feeds the stock to the eye, or opening, into the centrifugal impeller.

We have approximately 250 impeller patterns designed for handling paper stock alone. We use the type of impeller which will best suit any specific application.

We use our special design straight vane impeller for higher heads and relatively smaller capacities.

The HMS are designed for impellers at a maximum head of about 175 feet.

This is a point which we wish to stress because it is a point which is overlooked very easily in normal discussions of high consistency stock pumps. It is not the consistency which determines whether any specific pump will handle the job, but rather the total head in combination with the consistency.

We have run across certain applications where it is impossible to handle even 5 to 6% stock with any single centrifugal pump. We have also come in contact with other applications where any kind of stock can be handled at 9 to 10% without any difficulty. For instance, on a recent Hydrapulper installation, we had no difficulty dumping 9.7% kraft stock. If the line had been shorter, or we had more head development in this particular pump, there is no reason why we could not have handled 10 to 11% with the same pump.

We always stress the necessity of getting a sketch of the discharge piping before we release any pump design to our shop for fabrication. The reason for this is that our stock friction curves do not check out with the other curves as developed by other manufacturers.

High consistency stock is a viscous material and the friction loss when passing through an elbow is relatively small compared to the friction through the line. When handling water, the reverse is true because the loss through an elbow is exceptionally high due to the eddies set up by the water in going around the curve.

We have found that some of the companies figure relatively high losses through elbows when handling stock. Thus, if we take somebody else's figure for a total head, we sometimes find that when the line is long with few elbows, their figure is much lower than ours, and, vice versa, when the line is short with a number of elbows we find that their figure is much higher than ours.

There is one other factor which we have found quite important in handling paper stock and that is relatively low peripheral impeller speeds.

You have heard about impellers which can actually cut a hole in water. Excessively high peripheral speeds will cause the same effect with a viscous material such as high consistency paper stock. It is, therefore, necessary to keep the speeds of the impellers down as low as possible for good operating conditions.

High consistency pulping is, in a sense, tied in with high consistency pumping because the same characteristics of stock come into effect. We have found, for instance, that the pulping in a Hydrapulper at high consistencies, requires relatively low speeds of impellers. We have found that it is necessary to use relatively large diameter rotor ratios between the rotor and the Hydrapulper tub.

When these conditions are developed, we have no great difficulty in pulping high consistency stock.

As an example of this, we have pulped in our laboratory, paper stock at 16½% consistency. We are not as yet in a position to offer this machine commercially to the average mill because we have not developed pumping equipment, or refining equipment, to handle it at this consistency, so there is really no great advantage to it. However, we have done a lot of experimental work in our laboratory at Fulton and we feel that this high consistency pulping, when tied in with correct handling of the stocks at this consistency, can revolutionize the present treatment of stock.

"How Cheap Is Water?"

ARTHUR THURN
The Champion Paper & Fibre Co.

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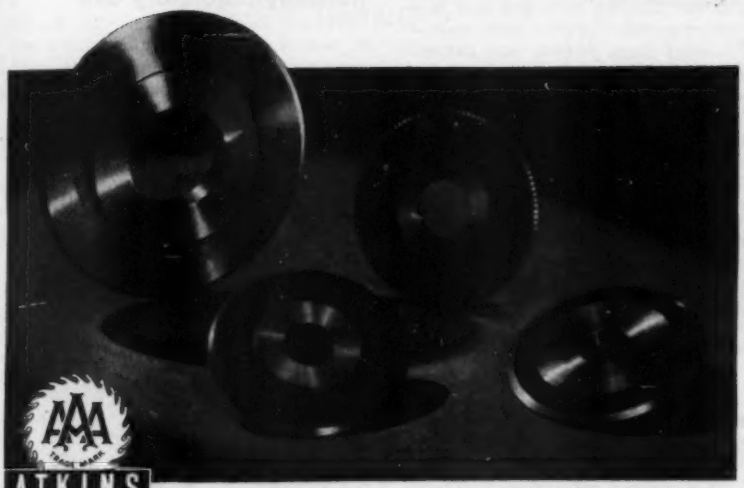

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water for mill use! Is not the cost higher than appears on the surface? Now consider the actuality of not only paying for that water, but it will cause you to pay again! You pay to have it processed for mill use. You add costly alum to get the proper *p*H. You use it on the paper machine—then you let it go to the sewer, carrying expensize fiber with it. That's why the initial cost of water isn't the only cost involved.

The reuse of white water wherever possible will reduce your grade costs. The use of white water on the machine showers and screens decreases the fresh water requirement. The alum usage is lowered because the correct *p*H is almost on hand. Then, too, the less water in the system the better the recovery of the fiber by its save-all. This fiber, when sent back to the machine's own beater will replace costly, hard-to-get fresh pulp. Therefore, the substitution of fresh water with white water would be made wherever possible.

The beater is the greatest individual consumer of white water. Since it is the greatest potential conserver of water, fiber, clay and alum, our beaters never use fresh water (exclusive of startups.)

Our Bird screens have drilled showers. Seldom do they use fresh water. However, since these showers are rather difficult to remove for cleaning, we are about to investigate the use of the self-cleaning shower.

Wire-cleaning showers are huge consumers of water. We use two types of wire showers. One is the self-cleaning shower with the plunger and the other is the drilled shower. The former is highly successful. The drilled shower is cleaned only periodically since the white water is kept as lean as possible in fiber content.

Foam sprays appear to be insignificant users of water but it is amazing how much water these sprays can squander. Our headbox sprays use fresh water exclusively. Each spray uses between 1.5 and 3 gpm. We are now replacing them with sprays which use 0.6 gpm. If the project is successful we hope to reduce our fresh water usage by upwards of 500,000 gallons a day.

It must be borne in mind that the extent of white water re-use depends almost entirely on the save-all. A great deal of attention must be given the save-all because the recovery of fiber and the effective use of save-all effluent has such an important bearing on grade costs. Our save-alls, which are very old, are watched closely. We systematically inspect the cylinder wire for holes and the deckle straps for leaks. We have increased the cylinder speed from 5 to 7½ rpm with excellent results. We have installed float valves and small reservoirs on the save-all intake in order to hold a maximum amount of water in the save-all without overflowing it. When there is too much water in the paper machine system for the save-all to handle, we bleed off the flat box pump since this is the leanest of the waters.

We periodically clean the save-all and save-all lines of scale and miscellaneous dirt. We keep close check on the save-all cylinder water so that this shower water is as lean as possible. We want to put as much fiber as we can back into the machine system.

Lean water isn't always good machine shower water. The length of the fiber in the water is more critical. One of our machines uses shower water containing over 5 lb. of fiber per 1000 gallons. On another machine we recently had trouble, because of the showers plugging, with shower water having only 1 lb. of fiber per 1000 gallons. A quantitative analysis of each affluent is very interesting. The shower water containing over 5 lb. of fiber was screened. No fiber was retained by a 60 mesh screen and only 5% on a 150 mesh screen. The water containing 1 lb. of fiber was likewise screened. 2½% of the fiber was retained on a 20 mesh screen; 6% on a 35 mesh screen, and 15% on a 150 mesh screen. This rather explodes the theory that one can peer through a bottle of save-all effluent and conclude that the water is satisfactory for use as shower water.

A sewer-loss summary of our No. 1 Mill at Hamilton, Ohio, is indicative of what a good water and fiber conservation program can do. The program began in earnest eight years ago. During this time, no major changes have been made on the 25-year old save-alls (or on any of the six paper machines) in spite of increased paper machine speeds and production. During the last four years we sent to the sewer 8000 gallons of water for every ton of paper made. The four years previous it was 13,000 gallons. We are spending

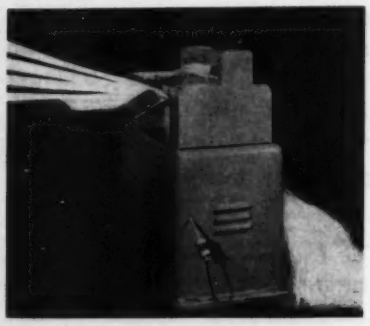
(Turn to page 1852)

NEW EQUIPMENT AND SUPPLIES

All-Purpose Shredding Machine

A new all-purpose shredding machine, called the *Shredmaster*, prepares paper for use as fancy packing and display material. It is being introduced by Shredmaster Corp., Brooklyn, N. Y.

This machine is designed to serve the requirements of paper manufacturers and converters where there is a need to shred many rolls at a time of wax, tissue, sulphite, bond, cellophane, foil, etc., as well as feed in news, over-issue, confidential paper, and waste. It can be set up to shred 1/32-inch widths and multiples thereof, without dust, litter, or undue noise; it has a reversing motor to automatically control unjamming, illumination of the input and output, complete enclosure, two speeds, adjustable input table and output chute, and complete safety



devices enabling operation by unskilled help.

The standard machine is set up for speeds of 120 and 200 fpm. It will shred automatically from rolls, or it can be used with hand feed. The machine also will shred rubber, leather, textiles, tobacco and fruit peels.

Laboratory Pulverizer

A laboratory pulverizer for use in the grinding of analytical samples has been announced by Pulverizing Machinery Co., 240 Chatham Road, Summit, N. J.

Known as the *Mikro-Samplmill*, the new unit, developed in collaboration with the Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, is furnished in two models. One model is for mounting on a laboratory bench; the other, with legs and ball bearing casters, can be moved about for use in any part of laboratory or plant. Both models, individually equipped with a ¾ hp. motor, have extension cord for plugging into a 110 volt line.

Manually operated inclined feed screw assures feeding of complete sample into the grinding chamber. All parts of the unit are so easily accessible that, with reasonable care in cleaning, loss of material is negligible—even in samples as small as 10 gm.

The body of the mill, hinged cover, feed screw, clean-out door and feed hopper are of bronze. Interior parts, such as mill housing liner, screens, and stamped patented one-piece rotor, are of stainless steel.

Speed of the mill is 3,000 rpm. An extra pulley is included for 12,000 rpm. This higher speed is recommended where finest screen does not produce sufficient fineness of product, as in the case of tough or resistant material.

The mill is furnished with screens, having .039, 1/16, and ⅛ in. round perforations. Coarser or finer size screens are available from stock. Also hopper can be furnished in stainless steel, if desired. Weights—uncrated, bench model, 125 lb., floor model, 160 lb.

Machine Clothing Life Extender

Margonal Products Co., Box 190, Alhambra, Calif., has announced *Margonal "B"* as a product for extending the life of paper machine clothing. Composed of compounded animal and mineral oils, *Margonal "B"* is metered continuously in slight amounts into the stock line. The paper web thus becomes the vehicle for carrying it as a protective film on both sides of the sheet.

According to the manufacturer, tests conducted under actual papermaking conditions for over a year have proven that *Margonal "B"* without any ill effects to the paper being produced will increase top and bottom felt life at least 20 per cent, and wire life by 12½ per cent.

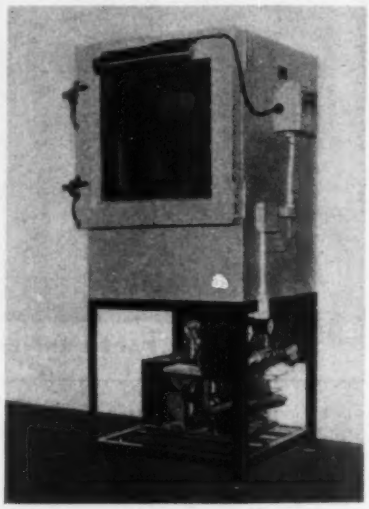
Pin Type Flexible Coupling

A pin type flexible coupling incorporating a Taper-Lock bushing has been announced by the Dodge Manufacturing Corp., Mishawaka, Indiana. (The bushing not only insures fastening to the shaft with firmness of a shrink on fit but also makes reboring unnecessary.) The center disc is of oak tanned leather. It can be removed by loosening coupling flanges and sliding them apart on shafts. Large diameter centerless ground pins which are pressed into the flanges can be easily renewed.

The coupling is compact in design. There are no projecting parts. It is machined all over to insure balance and true running.

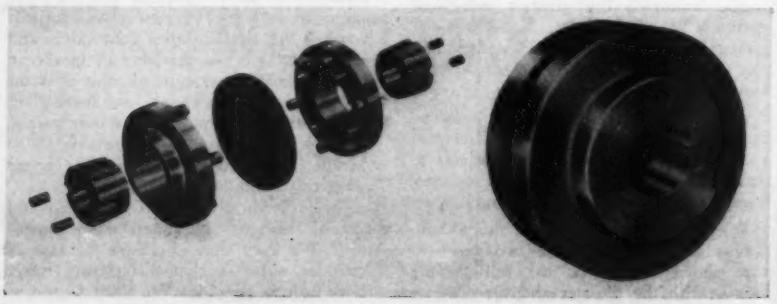
Self-Contained Temperature and Humidity Laboratory Unit

Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J., has announced a self-contained laboratory unit for accurately controlling temperature and relative humidity within a working chamber having a clear space of 18 in. by 18 in. by



18 in. The conditioning equipment is mounted directly beneath the working space in the chamber and includes a heating unit, vaporizer type of humidifier, and a 1/3 hp. air-cooled compressor having a thermostatic expansion valve incorporated in the refrigeration system. An external light provides illumination of chamber interior during tests and an inspection port on the door affords a view of the entire working area. The interior of the working space in the chamber is made of copper or stainless steel.

Among the claims made by the manufacturer for the unit are the following (1) Temperature within the chamber can be varied over a range from plus 20 Fahr.



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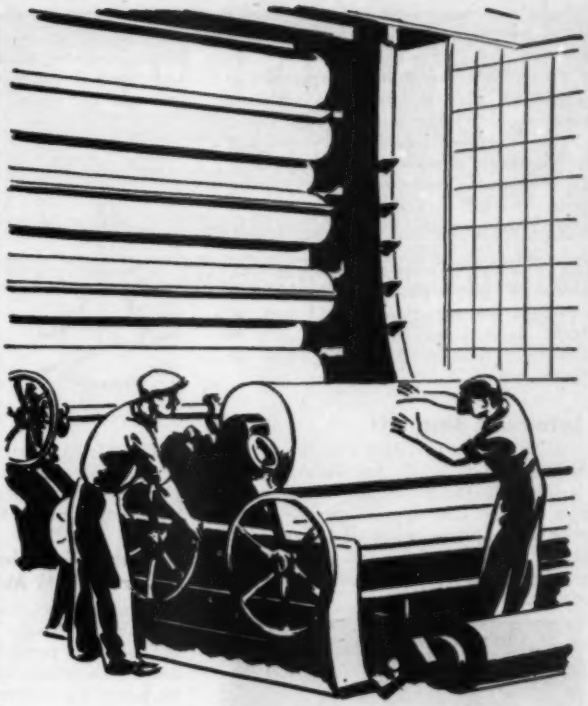

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Examine the rolls in your calender stacks. Are they producing the finish that makes a quality sheet? Are they giving extra hours of service without requiring turning down or refilling? America's leading paper mills control the quality of the finished product by filling calender stacks with Butterworth Calender Rolls. In many cases, a single Butterworth Calender Roll placed in the calender stacks with other rolls produced such superior results that these mills standardized on Butterworth Calender Rolls. They realize that the finish on the paper can only be as good as the rolls in the calender. Butterworth Calender Rolls are furnished new or refilled for any make calender. Write us today.

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Butterworth Calender Rolls

to plus 200 Fahr. (An extension of this temperature range is available when desirable.)

(2) When the desired temperature is reached, it can be maintained within a tolerance of plus or minus 2 Fahr.

(3) Relative humidity can be controlled above or below ambient at a minimum wet-bulb temperature of 33 Fahr. (An extended surface dry-expansion coil is used to lower the temperature or relative humidity, independently).

(4) Power consumption will not exceed 1.8 kw. (Standard models are equipped for operation on 115 volt, 60 cycle, single phase current, but may be had to operate on 230 volts when desired.)

Automatic Skid Lift

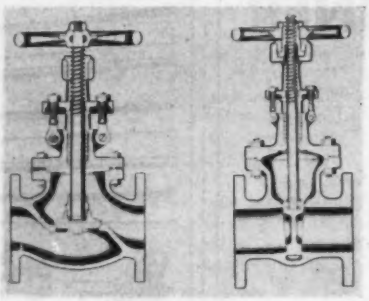
E. P. Lawson Co., Inc., 426 West 33rd St., New York, N. Y., has announced the Southworth skid lift for use in the operation of paper cutters, embossers, and other related equipment wherever manual lifting is required. Equipped with an electric eye, which automatically keeps the

work at predetermined levels, the skid lift does away with leg and back strain resulting from manual lifting. It is available in sizes 44 in. by 64 in. and 32 in. by 44 in.; and can be installed flush with the floor in permanent position; or can be equipped with a steel ramp for the easy placing of the skid.

Corrosion-Resistant Valves

Two new lines of corrosion-resistant alloy valves, globe and gate—in sizes 2½, 3, 4 and 6 in., and with flanged ends, has been announced by Crane Co., 836 S. Michigan Ave., Chicago, Ill. Both types are available in 18-8 Mo and in Monel metal, and are designed for working pressure of 150 psi liquid or gas and working temperatures up to 350 Fahr. Stem threads are on the outside; the stuffing box contains from 7 to 10 packing rings (depending on size of valve). Yoke-and-bonnet assembly is cast in one piece. The bonnet is bolted to valve body. A male-and-female bonnet joint makes it possible to retain the gasket in place without possibility of blowing out, and also minimizes leakage.

The 18-8 Mo valves are recommended for use in the pulp, paper, chemical and similar industries, and are stated to give good service in handling alum solutions, alkalis, bleaching solutions, sulphite liquors and vapors in paper mills, and many other industrial chemicals.



The Monel metal valves also are recommended for use in chemical, dyestuffs and similar industries for the handling of numerous corrosive fluids.

Portable a-c Glass Electrode pH Meter

National Technical Laboratories, 820 Mission St., South Pasadena, Calif., has announced a portable glass electrode *p*H meter. Designated as the *Beckman Model H meter*, the instrument can be plugged directly into any standard 110 v. 50/60 cycle a-c line, and can be easily transported from one location to another or installed permanently.

The Model H covers the full scale of 0 to 14 *p*H and can also be used for making millivolt readings within the range 0 to ± 410 millivolts. Measurements of *p*H can be made to an accuracy of 0.03 *p*H unit, and millivolt readings to 2 millivolts. A netural position on the switch disconnects the indicating meter from the electrical circuit to avoid excessive swinging of the meter needle during warm-up periods and when changing test samples or electrodes.

Standardization with one buffer gives accurate measurements over the full range

of the instrument, thus eliminating cross checking between two buffers. The instrument may be checked and corrected for drift at any time by simply pressing a button on the electrode terminal and bringing the needle to the pointer position with the standardization control.

The Model H features a built-in temperature compensator dial calibrated 0 to 100 C. which can be set at the temperature of the test sample.

Changes in circuit constants, due to temperature effects, are approximately 0.1 *p*H unit in the first hour and are negligible thereafter. However, any changes that do occur may be easily and readily corrected without recalibration to a buffer solution by simply pressing the button and turning the Standardization Control knob until the needle matches the pointer position.

The Model H comes equipped with patented internally-shielded Beckman glass electrodes with integrally attached shielded leads to eliminate electrostatic interference. Each electrode is permanently sealed and has a sturdy immersion end made of special glass. Various types, shapes and sizes of glass electrodes are available for the Model H to meet various operating requirements—high temperature operation, high *p*H operation in presence of sodium ions, direct immersion in sludges, abrasive earths, etc. Electrodes are freely interchangeable and only a single buffer check at any convenient *p*H is required to set the controls when installing a different electrode.

The model H instrument measures 12x 9½x8½in. over-all, and has a net weight of 14 lb. It has a power consumption of 35 watts and is supplied complete with electrode support rod, electrode holder, glass electrode, calomel electrode, pint of *p*H 7.00 concentrated buffer, 100 ml. saturated KCl solution and 50 ml. Pyrex beaker.

Belt Cutter for Belts Up to 60 In. Wide

Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill., has announced a wide belt cutter, the *No.* 300 "*Alligator*," for the cutting of belts up to 60 in. wide and 1⅛ in. thick. The cutter is

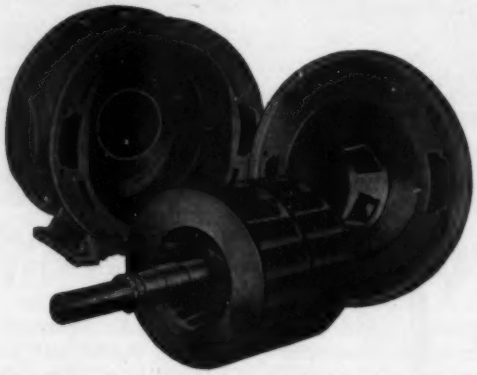
made up of two elements—the head that carries the blade and a T-shaped base or guide rail.

The blade consists of a long, thin, narrow strip of steel sharpened in a V shape. It is held in a slot in a vertical position in the head and vertical adjustment is accomplished by means of a screw.

The base is made in four lengths, each base being four inches longer than the width of belt on which it is designed to operate—the belt width being 24, 36, 48, and 60 in.

To use the cutter, the base first is squared up with the center line of belt or nailed to it. Then the cutter, positioned on the base, is pushed across the belt to make a cut about ⅛ in. deep. After making a cut, the screw is turned to lower the blade another ⅛ in. and the operation continued until job is finished.

SIMPLICITY



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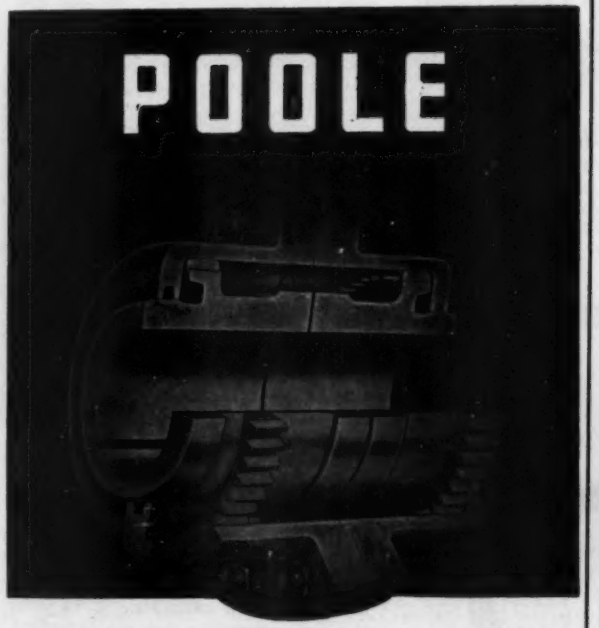

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Single Stroke Lift Truck

A single stroke lift truck, designed for use with skid loads up to 2500 lb., has been announced by the Lyon-Raymond Corp., Greene, N. Y.

Exclusive features claimed for the truck include greater underclearance for

negotiating ramps and lightness in weight —both made possible by a single frame formed of heavy gauge steel plate. Front wheels are eight inches in diameter, and are equipped with Timken roller bearings.

Other desirable features mentioned by the announcement are: a 180 deg. radius, push button action to engage the lifting device, safety lock on handle to prevent injury to operator, and a built-in hydraulic release check.

The truck is available in a wide range of sizes for use with all popular size skid platforms.

Inconel Flexible Tubing

Titeflex, Inc., 419 Frelinghuysen Ave., Newark, N. J., has announced a flexible tubing made with Inconel inner core and braid. The inner core is supplied with a wall thickness of from 0.005 to 0.015

in.—the thicker tubing for larger sizes where high pressure is the primary requisite, the thinner wall where the pressure is not over a few hundred pounds per sq. in. and the weight is critical.

The hose may be supplied with flat ribbon or round wire braid—the flat ribbon for higher pressures and resistance to fatigue, especially for sizes of 1 in. or more.

The Inconel flexible tubing is recommended for extreme service conditions where Monel metal or brass would be affected. The tubing is supplied for temperatures up to 1700 deg.

Sodium Carboxymethylcellulose

Hercules Powder Co., Inc., Paper Makers Chemical Department, Wilmington, Del., has announced the introduction of sodium carboxymethylcellulose to the paper industry. This product a free-flowing white powder, designated as CMC, gives added internal and surface strength to paperboard as well as added resistance to penetration of oils and waxes. It can be added at the calendar stack or size press, and may be used separately or in conjunction with conventional surface treating materials such as starch, wax, and wax-resin emulsions.

Starch Stabilizer

Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y., has announced the development of a stabilizer for fluid or heavy paste starch solutions. Called *Flovis*, the stabilizer is added to the starch during the boiling process in amounts of from 0.5 per cent to 2.00 per cent of the weight of the starch.

According to the manufacturer, solutions made from starches to which the stabilizer has been added remain more fluid—the stabilizer retards set and prevents lumping. It is also claimed that even if "set" occurs, the effect of the stabilizer is not lost since the "set" can be overcome by simple stirring.

▼

"How Cheap Is Water?"

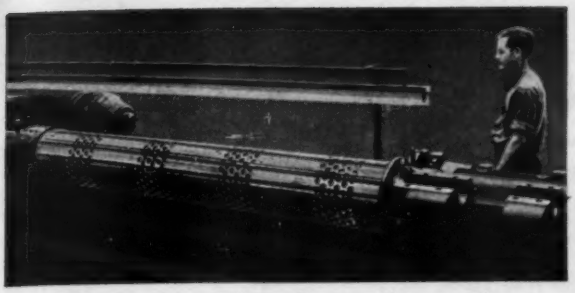
(Continued from page 1847)

$14,000 per year less for water now than we did four years ago. During the last four years we sent to the sewer the fiber equivalent of 0.70% of the machine production. The four years previous it was twice as much. Assuming a fiber cost of only $50 a ton, we save $36,000 a year now as compared with the four previous years. The total saving is $50,000 a year.

There are other savings which are apparent but on which figures are not available. The re-use of white water indeed saves alum, filler and dye-stuff. Furthermore, we collect a large portion of heat-exchange water and force it back into the main header.

Believe it or not, we have machine bosses who actually prefer white water to fresh water and only use fresh water as a last resort. Their cooperation in the water and fiber conservation program is excellent. That's why our program is going ahead and we expect still further savings and still less waste.

As for those who admit that water is the cheapest of papermaking materials, they should bear in mind that because it can result in such large savings, fresh water should be used sparingly and white water judiciously and patiently.



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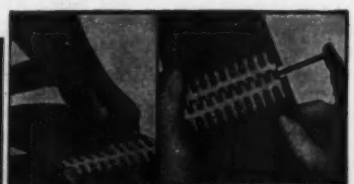

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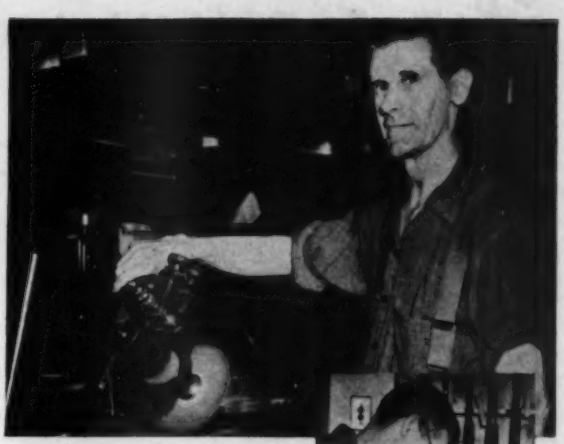

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"When our work is over, we can turn to our hobbies, our homes, our community. My hobby happens to be guns. I like old guns, like to repair them, and my precision training in the factory helps in the precision work on my guns. When I get my guns right I like to take them into the fields and the woods to try them. So one way and another, Maine is the only place where I want to live and work."

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Antioxidant Made from Sulphite Waste Liquor

By the action of hydrobromic acid in acetic acid on conidendrin (isolated from western hemlock sulphite waste liquor) the authors prepared "norconidendrin" which shows antioxidant activity when applied both in hydrogenated and unhydrogenated cottonseed and peanut oils, and in lard. Its activity is comparable with that of other polyhydric phenols. The antioxidant activity of norconidendrin was greatly enhanced by the addition of acid type synergists. It may be added with approximately equal effectiveness either before or after deodorization. When added before the oil is deodorized, noconidendrin contributes no odor, color, or flavor to the finished product. However, practical applications of the antioxidant in preserving food products should await studies on its toxic or nontoxic properties. G. S. Fisher, Lillian Kyame, and W. G. Bickford. *J. Am. Oil Chemists* Sec. 24, No. 10, 340-3 (1947).

Titration of Black Liquors

The ordinary method for the titration of black liquors from the alkaline digestion of wood, grasses and of straw to determine free alkali gives low values because the method is only valid for pure mixtures of sodium hydroxide and sodium carbonate. Conductometric titrations serve to overcome this difficulty. The first inflection point in the titration curve gives the true free NaOH and the second point gives the total alkali of the liquor. J. H. Young and W. T. Jones, *Proc. Tech. Section, Paper Makers Assoc. Gt. Britain and Ireland* 27,229-32 (1946) through C. A. 41,7116.

Picking Resistance of Paper

The author discusses the relationship between furnish, loading, and picking resistance, as well as the effects of beating, machine speed, etc. upon picking resistance, as well as the effects of beating machine speeds, etc., upon picking resistance. Twelve special paper samples were prepared from bleached sulphite, bleached straw pulp and from groundwood. In these only two components (furnish and filler) were altered one at a time. Picking tests were made in a printing press with a block (50 x 23 mm.) on samples 22 cm. square, using a colored mineral oil at 18 C. and 65 per cent relative humidity. The following conclusions were reached: picking resistance shows little difference on the felt or on the wire side of the same paper sample, and is practically independent of the sheet direction. It is, however, reduced by calendering, by increase in loading, and by the incorporation of straw, groundwood or starch into the paper. Generalizations on the influence of wetness could not be made. Well-beaten stock shows greater resistance to pick than does stock less beaten (provided the fibers are not too greatly shortened during the beating operation). Picking which occurred at printing speeds of 2640-3240 impressions per hour was absent at higher speeds. Comparative tests were made using the "BeKK picking resistance meter," and in general, the results agreed fairly well with those above; however, there were some variations which are discussed by the author who feels that the BeKK meter should be used with certain reservations. H. V. P. HeuKensfeldt Jansen, *Papierwereld* 1, no. 15, 228-30, no. 16, 151-3, and no. 17, 260-1 (1947); *Tech. Bull. Paper Makers' Assoc. Gt. Britain & Ireland* 24, nos. 4-6, 26 (1947) (Original in Dutch; abstract in English).

Oxycellulose

The authors describe a means of differentiating between hydrocellulose and oxycellulose. This is based on the hydroxylamine reaction with carbonyl groups in oxycellulose. The "carbonyl number" thus obtained, correlated with the copper number, may be used as a measure of cellulose degradation. One gram of the material to be tested is wetted down with 20 cc. of tenth normal hydroxylamine hydrochloride and 10 cc. tenth normal caustic soda. The mixture is allowed to stand 20 minutes at room temperature, and is then titrated with tenth normal hydrochloric acid (methyl orange being used as indicator), to determine the hydroxylamine left in the residue. The "carbonyl number" is calculated as 2.8 $(a\text{-}b)/c$, where a is the number of cc. of 0.1 normal hydrochloric acid (in a blank titration), b is the 0.1 normal acid used in titrating the unknown sample, and c is the weight of cellulose in grams. M. Krajcinovic and Mladen Krajcinovic. *J. Applied Chem.* (U.S.S.R.) 19, 424-7 (1946), through C. A. 41, 1434 (1947) (Original in Russian; abstract in English).

Effect of Dyestuffs on Paper Strength

Strongly dyed kraft papers (such as those used in bags and as spinning paper) are often lower in strength properties than are undyed products made from the same stock. Unbleached sulphite pulp was defibered in an experimental beater for one hour, and then beaten for two hours to 40 deg. S. R. No size was added. The pulp was then divided into six portions. Two of these were not treated with alum; two were adjusted to *p*H 4 with alum; and the other two were treated with alum to give *p*H 3.5. Sample sheets (made with and without addition of dyestuffs) were formed without couching and strips were cut from the sheets, conditioned at 20 C. and 65 per cent relative humidity, and tested for tensile strength, folding endurance and burst. The dyes used were usually those ordinarily applied in manufacturing kraft papers. They included basic, acid, substantive, and "Sirius" dyes, combinations of acid and basic colors, and certain mineral pigments. Basic colors caused lowering in folding endurance and in tear. Acid colors lowered these properties slightly. Substantive dyes apparently had very little effect. Van Dyke Brown (pigment) actually caused an increase in paper strength. Silver Gray lowered the folding endurance slightly, whereas Paris blue caused a marked decrease in this property. Tabulated data are given. Georg Wünschmann. *Papier-Fabr.* 39, no. 50-52, 289-93 (1941) (in German); through B.I.P.C. 18, 232 (1947).

Butyrate Hot Melt Coatings

A report from the Eastman Kodak Co. shows that newly developed hot melt compositions that contain large amounts of flow viscosity cellulose acetate butyrate and smaller amounts of plasticicizers, resins and waxes may be applied at high speeds without solvent hazards. They yield protective packaging papers with high block temperatures. The author discusses their properties and uses. Martin Solo. *Modern Packaging* 20, No. 12, 127-8, 166,168 (1947).

Lake States Forests and the Paper Industry

This article discusses the pulp, paper and board mills of Michigan, Wisconsin and Minnesota, and their products. About 25 per cent of the pulpwood consumed is imported (largely from Canada). Approximately 1.5 million acres of the regions saw timber is in old growth stands. There are 49 million acres which are second growth stands and which comprise in part denuded areas on which forests grow at not more than one third of their potential capacity. However, about 20 per cent of the timber of merchantable size is so poor in quality, so widely scattered, or so remote that it cannot be harvested economically under present conditions. The realizable growth of trees now suitable as pulpwoods is estimated at approximately one million cords of spruce, balsam, jack pine and hemlock, and two million cords of aspen. Under proper forest management these figures might well be increased two to threefold. During 1944, the cuttings of coniferous woods (of pulpwood size) exceeded the growth by 80 per cent. The present drain on aspen is about one-third of its growth. The use of the latter (for pulp manufacture) has increased greatly in recent years. In 1944, it represented 18.4 per cent of all the pulpwood species used. Whereas losses by fire, insects, and disease have decreased, destructive logging is still a major problem. Aspen and other little-used species should be increasingly used until crops of more valuable species can be grown. Other conservation methods are also emphasized. E. L. Demmon. *Lake States Timber Digest* 2, no. 2, 3-4; no. 3, 6, 12 (1947).

LEADING PAPER MILLS Use Papermakers'

D-I-LESTOIL

(In cooking, washing or pulping)

for...

1. DE-INKING — newsprint, magazine and ledger papers.
2. DE-WAXING — cotton linters — waxed papers.
3. DE-GREASING — rope stock — cotton mill sweeps.
4. REMOVAL of — Asphalt — Pitch — Adhesives — Sizing and other troublesome soil from all raw stock.
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Completely automatic systems for the filtration and dehydration of lubricating oils for all types of paper mill machinery.
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—LIQUID CONTROL SPECIALISTS SINCE 1885

New Catalogues and Publications

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.—In a 12-page bulletin just issued by this company, "Products for Heating, Ventilating, Air Conditioning" are descriptions and photos of Texrope V-Belts, Drives and Sheaves, as well as centrifugal pumps, a-c and d-c motors, motor controls, dry-type transformers and a-c and d-c welders. Ask for Bulletin No. 25B6183.

American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y. —An informative bulletin on the subject of Sodium Phosphate Aluminate has been issued by this company. The booklet includes the principal applications of this product in the paper industry. It may be obtained from either the Heavy Chemicals Department or the Synthetic Organic Chemicals Department, at the above address.

The Brown Instrument Company (Division of Minneapolis Honeywell Regulator Company), Philadelphia 44, Pa.—Illustrated in the new booklet issued by this company, "Instrumentation for the Paper Industry," are some of the many instrument control systems for use in the pulp and paper industry. Descriptions are given of twenty-six typical process control instrumentations applicable to this field. Included are rotary and spray type sulphur burning systems, measuring tank control, recovery and lime kiln instrumentation, dryer control, moisture measurement, bleach plant instrumentation, and others. Complete schematic drawings and general specifications are given in each case. Typical examples of equipment designed specifically for measurement problems of the pulp and paper industry are the Moist-O-Graph and the Modified Area Meter Body. Other instruments used in paper applications are liquid level recorders, furnace pressure controllers, indicating and recording thermometers, pneumatic receivers and transmitters, the Electr-O-Vane recording controller, flow meters, Electronik potentiometer controllers and recorders, pyrometers, control valves, motors and accessories. There is also a section with bulb specifications, thermometer recording, scale and temperature pressure charts. Address the Brown Instrument Company, Wayne and Roberts, Philadelphia 44, and ask for Bulletin No. 2801.

Clark Equipment Company, Tructractor Division, Battle Creek, Mich.—The current issue of "Material Handling News" describes Clark fork trucks and towing tractors as "largely assemblies of Clark products." It contains a tabloid history of the company's product-by-product growth and the value of the experience gained through each product. The attractive bulletin is illustrated with photographs. Also available from this company is a 40-page catalogue presenting a full line of its machines and special handling attachments. It includes several application illustrations, including paper handling. Copies on request.

W. C. Dillon & Co., Inc., 5410 W. Harrison, Chicago 44, Ill.—Now available from this company are two bulletins. One describes its Dynamometer, a precision testing instrument. The other is an engineering catalogue, in which is described the company's instruments for precision engineering, including multi-low range universal testers used for tensile, compression, transverse and shear testing of paper. Space is also given to dial thermometers for use in pipes, tanks, cookers, etc., which will be of special interest to paper manufacturers.

Dings Magnetic Separator Company, 4740W. McGeogh Ave., Milwaukee 14, Wis.—Now available from this company is bulletin No. 1120, describing the operation of its laboratory in solving separation problems in many industries. The procedure to be followed in arranging tests is described. Wood pulp is one of the materials tested.

The Falk Corporation, 3001 W. Canal St., Milwaukee 8, Wis.—Complete description of the new Backstop produced by this company, which prevents reverse rotation on conveyor drives, etc., is given in Bulletin No. 10,080. Information on sizes, capacities and dimensions is included, as well as photos and drawings.

E. D. Jones & Sons Company, Pittsfield, Mass.—Descriptive of its High-Speed Refiner is Bulletin No. EJD-1011, issued by this company. Uses and results obtained from typical applications of the refiner are listed, also the various features and general arrangements of the machine, together with specifications. Also available from this company is Bulletin No. EDJ-1007, which includes design features, general characteristics, descriptive illustrations and drawings of the Jones Jordans. Data are also given about the Type W Plug and the Double Wedge Greylock Shell Filling and the Patented Nowave Plug and Shell Filling.

The Owen Bucket Company, Breakwater Avenue, Cleveland 2, Ohio—Just off the press is their interesting, well-illustrated booklet, "Owen Grapples for Pulpwood Handling," which contains tables of specifications and photos of applications. The illustrations show how the Grapple operates in almost any phase of pulpwood handling.

R-S Products Corporation, Electronic Division, Wayne Junction, Philadelphia 44, Pa.—In a new catalogue, No. 27, this company has published a completely detailed description of its Leveltronic Relay, designed for basic application in the control of liquid level and interface temperature pressure. Applications and specifications are included. Available upon request.

Joseph T. Ryerson & Son, Inc., P. O. Box 1919, Pittsburgh, Pa.—Recently published is an illustrated booklet giving a summary of the stocks, facilities, and personnel at its plant in the Pittsburgh area. Write to the above address, Pittsburgh 30, Pa.

Thwing-Albert Instrument Co., Penn St. and Pulaski Ave., Philadelphia 44, Pa.—Just printed is a new booklet, P-478, describing this company's Electro-Hydraulic Tensile Strength Tester. The booklet also contains a brief historical background of the tester, as well as a breakdown of the instrument into component parts, diagrams and pictures, models and ranges available, operational details, accessory items, etc.

Tube-Turns, Inc., 224 East Broadway, Louisville 1, Ky.—An authoritative booklet, "Stainless Steel Piping—Why and Where to Use It," is a welcome addition to the reference libraries of piping engineers. It was written by J. D. Mattimore, chief engineer of the product and research division of Tube Turns, Inc. Among the subjects covered are: five major reasons for using stainless steel piping; types of stainless steels; standardization of pipe and fittings; selection of pipe joints, and fabrication by welding. There are also numerous tables and illustrations. The booklet may be obtained without charge by writing to the above address.

BOOKS

Best's Safety Directory for 1948—The second annual edition of this unique directory is now available to industry. Published by "Safety Engineering Magazine," a division of Alfred M. Best Company, Inc., this directory, the first safety directory of its kind, combines all the best practical features of a Safety Manual, Directory, Index, Encyclopedia, and Catalogue into an illustrated and comprehensive volume of 494 pages. It might be termed the "What, How and Where Book of Safety," showing what safety products or devices to use for specific hazards; how to use them; where to get them. The actual content of this second edition is increased 50 per cent; it also has been editorially revised and rearranged. The indexing and subject grouping system of this book make it easy to locate safety products even when the user is not certain of the type or name of the product he needs. This directory is endorsed by leading compensation insurance companies and included in its contents are the standards established for safety equipment by the leading standards group. The price of the book is $5.00, with lower rates for quantities. It may be obtained from the home office of the publisher, Alfred M. Best Company, 75 Fulton Street, New York 7, N. Y., or any of the company's branch offices.

Papermaking—The History and Technique of an Ancient Craft (Second Edition)—The works of Dard Hunter, master craftsman of papermaking, are about as well known as paper itself; he is recognized as the most widely quoted authority on paper facts and history.

The first edition of this valuable work by Dard Hunter was published in 1942 but has been exhausted for some time. The text from the new volume has been reset and the book printed from new plates. There are new chapters covering the technique of modern handmade paper fabrication and present-day watermarking practices. There is also new material relating to the making of papyrus and the primitive bark-papers of Mexico and the islands of the Pacific. Comprehensive studies of forgery and counterfeiting have been added. All of the material of the first edition is retained; there is a comprehensive history of papermaking from its invention in China, its development with characteristic differences in other Oriental countries, and its introduction into Europe. Chronologically, the reader takes up the manufacture of paper in the Western world, is introduced to graphic arts, and follows the history of the paper machine. In this volume, the average reader, and many researchers will find answers to their questions about paper. The price of this book is $12.50; it may be obtained from the publisher, Alfred A. Knopf, Inc., 501 Madison Avenue, New York 22, N. Y.

Surface Chemistry for Industrial Research—The author of this work, J. J. Bikerman, Merek Research Laboratories, has adapted the fundamentals of Surface Science to industrial research. In the preface the author states that the book does not teach the procedures of any industry; rather it is slanted toward the men who know what is being done in a plant but who would like to know why this is done a certain way and whether it can be done better. The fundamental knowledge contained in this volume will, it is hoped, be valuable for such research. The book deals with surface physics as well as chemistry. The contents of the book are laid out in six chapters, as follows: Chapter I—Liquid-Gas; Chapter II—Liquid-Liquid; Chapter III —Solid-Gas; Chapter IV—Solid-Liquid; Chapter V—Solid-Liquid Gas. Solid-Liquid-Liquid; Chapter VI—Electric Surface Phenomena. There are 464 pages and a large number of graphic figures. Each part is concluded with a reference table and the book ends with an extensive subject index. The publisher is Academic Press, New York 10; the price, $8.00.

BOARD MILL SCREENS

Probably more Board Mill Screens are equipped with **Fitchburg NEW TYPE-DUPLEX SLOT Screen Plates** than any other type of plate.

High capacity . . . permanent true slot alignment . . . Freedom from "strings" and plugged-up slots.

Get a full day's work from your screens with these remarkable plates. Furnished in tough, "Fitchburg Bronze," plain or chromium plated.

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FAST WAY TO CLEAN Drying Roll Frames

LONG-NEGLECTED gear-side and frames of drying roller section of papermaking machine may be cleaned quickly and safely this economical Oakite way:

Use the Oakite Sprayer, Model No. 374, with union-type nozzle, to apply full-strength solution of fast-acting Oakite Renovator. Spray solution over all exposed surfaces, allow to soak, then apply a hot-water pressure hose rinse. Oil, grease and dirt are thoroughly removed. Other time-saving procedures in 28-page Oakite Papermill Booklet. Write for it TODAY. Free without obligation.

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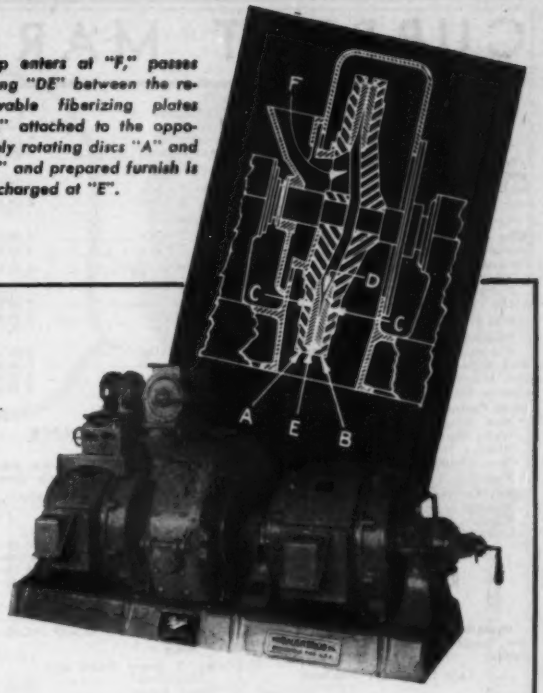
Specialized Industrial Cleaning

Pulp enters at "F," passes along "DE" between the renewable fiberizing plates "C," attached to the oppositely rotating discs "A" and "B," and prepared furnish is discharged at "E".



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SAVINGS ON FURNISH IMPRESSIVE

Mills processing hard wood sulphite in lieu of spruce sulphite are installing Bauer pulpers—and with notable results.

Hard wood sources, heretofore neglected, now being tapped. Organic dirt dispersal up to 90%, resulting in far greater cleanliness.

High freeness being maintained.

No cutting, but good formation and noticeable increase in strength.

The above listed benefits are impressive, especially at mills with plenty of hard wood available, where savings of several dollars per ton of furnish are being realized.

BAUER PULPERS also standard equipment for pulping of screenings and rejects.

THE BAUER BROS. CO.
SPRINGFIELD, OHIO

CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

(All Prices Are Nominal)

	per cwt.
Blue Overalls	9.00 to 9.50
Corduroy, Men's	6.50 to 7.00
Corduroy, Ladies'	6.50 to 7.00
Washables, No. 1	6.50 to 7.00
Percales	8.00 to 8.25
Light Prints, No. 1	7.75 to 8.25
Khaki Cuttings—	
Bleachable	7.25 to 7.75
Unbleachable	6.50 to 7.00
New White Canvas	12.00 to 13.00
New Mixed Blacks	5.50 to 6.00
Canton Flannels, Bleached	11.50 to 12.00
Shirt Cuttings—	
New White No. 1	12.50 to 13.00
White Shrunk	11.00 to 11.50
Silesias No. 1	9.00 to 9.50
New Unbleached	13.00 to 13.50
Fancy	7.00 to 7.50
Linen Cuttings—	
American	8.50 to 9.00
White	14.50 to 15.50
Grey	13.50 to 14.50

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

(All Prices Are Nominal)

	per cwt.
Roofing—	
No. 1	2.05 to 2.05
No. 2	1.90 to 1.95
No. 3 and No. 4	1.70 to 1.80
Twos and Blues—	
Repacked	3.25 to 3.50
Thirds and Blues—	
Repacked	2.00 to 2.25
Miscellaneous	2.50 to 2.75
Whites, No. 1—	
Repacked	4.50 to 4.75
Miscellaneous	3.75 to 4.00
White, No. 2—	
Repacked	3.50 to 3.75
Miscellaneous	3.00 to 3.25

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

(All Prices Are Nominal)

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	6.75 to 7.00
Wool Tares—	
Light	6.75 to 7.00
Heavy	7.25 to 7.50
No. 1 Scrap Bagging	6.00 to 6.25
Manila Rope—	
No. 1 large	6.50 to 6.75
No. 1 small	5.50 to 5.75
Sisal Rope—	
No. 1 large	6.00 to 6.50
No. 1 small	5.50 to 6.00
New Burlap Cuttings	6.75 to 7.25
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	4.50 to 4.75
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

(All Prices Are Nominal)

	per ton
Shavings—	
Hard White Env. Cuts	150.00—
Hard White, No. 1	130.00—
Soft White, No. 1	100.00—
Soft White, One-cut	120.00—
Soft White, Misc.	90.00—
Fly Leaf, No. 1	55.00—
Fly Leaf, Woody, No. 1	45.00—
No. 2 Mixed Col. Woody	35.00—
Flat Stock—	
No. 1 Heavy Books and Magazines	30.00 to 32.50
Mixed Books	22.00 to 23.00
Ledger Stock—	
No. 1 White	95.00 to 100.00
No. 1 Mixed (Colored)	80.00 to 85.00
Manilas—	
New Env. Cuttings	130.00 to 140.00
New Env. Cuts, One-Cut.	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	90.00 to 95.00
Colored Manila Tab Cards	65.00 to 70.00
Kraft—	
New Envelope Cuttings	115.00 to 120.00
Tripled Sorted No. 1 100%	70.00 to 75.00
New 100% Cor. Cuts	65.00 to 70.00
No. 1 Old Assorted	50.00 to 55.00
News—	
White Blank	90.00 to 95.00
Overissue	24.00 to 25.00
No. 1 Baled	19.00 to 20.00
Old Corrugated Containers	28.00 to 29.00
New Corrugated Cuts	36.00 to 38.00
Mill Wrappers	23.00 to 24.00
Box Board Chips	10.00 to 11.00
No. 1 Mixed Paper	12.00 to 13.00

CHEMICALS

f.o.b. shipping point

(All Prices Are Nominal)

Alum (Papermakers)—	
Lump, cwt.	4.25—
Ground, cwt.	4.00—
Powdered, cwt.	4.40—
Blanc Fixe—	
Pulp, bulk, ton	$72.50—
Dry, barrels, pound	82.50—
Bleaching Powder—	
Drums, cwt.	3.00 to 3.50
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	32.00 to 34.00
Argentine, lb.	29.50 to 30.50
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	15.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.25 to 2.50
Gelatine (silicin), lb.	1.60 to 1.65
Glye. (C.P.) drums, lb.	39½ to .40
Litharge, powd., bbl., lb.	16.60 to 17.00
Rosin (Gum)—	
New York, per 100 lbs.	
E	8.60—
F	8.60—
G	8.60—
WW	9.50—
Rosin (Wood), carlots	6.50—
Salt Cake—	
Dom. bulk (wks) ton	20.00 to 25.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	25.00 to ——
Soda Ash—	
Bulk (works), cwt.	1.10 to 1.20
Paper Bags, cwt.	1.25 to 1.35
Barrels, cwt.	1.35 to 1.60
Soda (Caustic)—	
Solid drums, cwt.	2.65 to 2.85
Ground and flake, drums, cwt.	3.00 to 3.25
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 35 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	7.06—
Pearl, barrels, cwt.	7.06—
Paper, (Sp.) bags, cwt.	7.06—
Powdered, barrels, cwt.	7.27—
Sulphur (Crude)	
(Mine) bulk, long ton	16.00 to 18.00
Talc—	
Dom. 100 lb. bags (mine) ton	20.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig, bbls., lb.	18 to .18½
Calcium Pig, bbls., lb.	18 to .18½
Zinc Sulphide, bbls., lb.	10.50 to 10.75

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

(All Prices Are Nominal)

Bleached sulphite, Swedish	175.00 to 185.00
Bleached sulphite, Finnish	185.00—
Bleached sulphite, dom.	130.00 to 135.00
Easy bleaching sulphite	—
Unbleached sulphite, Swed.	145.00 to 165.00
Unbleached sulphite, Fin.	155.00—
Unbleached sulphite, dom.	125.00 to 130.00
Unbleached kraft, Swedish	140.00 to 155.00
Unbleached kraft, Finnish	147.50—
Unbleached kraft, northern	125.00 to 135.00
Unbleached kraft, southern	110.00 to 125.00
Bleached sulphate, Swedish	175.00 to 185.00
Bleached soda, domestic	130.00 to 135.00
Sulphite screenings, dom.	60.00 to 70.00
Sulphate screenings, dom.	60.00 to 70.00
Groundwood, domestic and Canadian	80.00 to 85.00

PAPER

f.o.b. New York City

(All Prices Are Nominal)

	per ton
Boards—	
Binders	94.00—
Chip	90.00—
Chip, tube and can	95.00—
Chip, full blending	97.50—
Chip, sgl. mla. lined	95.00—
Coated, white patent .018	120.00—
.020 and heavier	110.00—
Kraft liner	79.00—
Filled News	90.00—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)

Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	14.25—
B Grade E. F.	—
C Grade E. F.	—
D Grade E. F.	—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	19.85—
No. 2 Glossy	18.30—
No. 3 Glossy	17.60—
No. 4 Glossy	—
No. 2 Offset	15.25—
C1S Lithe (Varnish)	—
C1S Lithe (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

	per cwt.
Rag Content Bond—	
(In Ton Lots)	
Extra 100% Rag	48.70—
100% Rag	42.70—
75% Rag	33.10—
50% Rag	27.50—
25% Rag	24.50—
Rag Content Ledger—	
(In Ton Lots)	
Extra 100% Rag	48.70—
100% Rag	42.10—
75% Rag	33.10—
50% Rag	28.25—
25% Rag	25.10—
Sulphite Bond—	
Air dry, watermarked	—
No. 1 watermarked	18.25—
No. 2 watermarked	17.25—
No. 4 watermarked	16.50—
Sulphite Ledger—	
No. 1 watermarked	18.85—
No. 2 watermarked	18.05—
No. 4 watermarked	17.35—
Glassine (f.o.b. mill)—	
Embossed (25 lbs. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof— Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
News—	
Rolls, Standard (Contract)	96.00—
Rolls (Spot)	(Nominal)
Sheets	115.00—
Tissues (Carlots)—	
White No. 1	1.85—
White No. 2	1.70—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.85—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and sub'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs	8.50—
Toilet, Unbleached (M. shts.) per cs	8.00—
Towels—	
Bleached	4.75—
Unbleached	4.00—
Wrappings (Kraft)—	
Super-Standard	8.00 to 9.00
No. 1 Wrapping	6.75 to 7.25
Standard Wrapping	6.50 to 7.00
Standard Bag	6.50 to 7.00
Variety Bag	—
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)	
Bleached Papers—	
M.F. & M.G. Waxing, 20 lb. (Carloads only (10,000 lbs.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers— Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch & Dry Fin. Grec. Sulphite, 30 lb.	—
No. 2 Imit. Parch & Dry Fin. Grec. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
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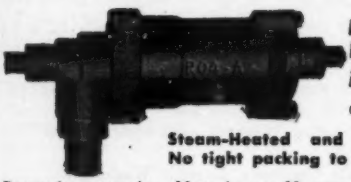

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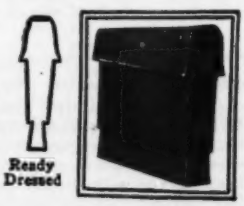

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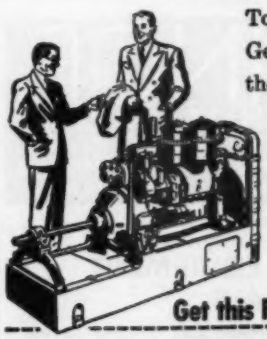

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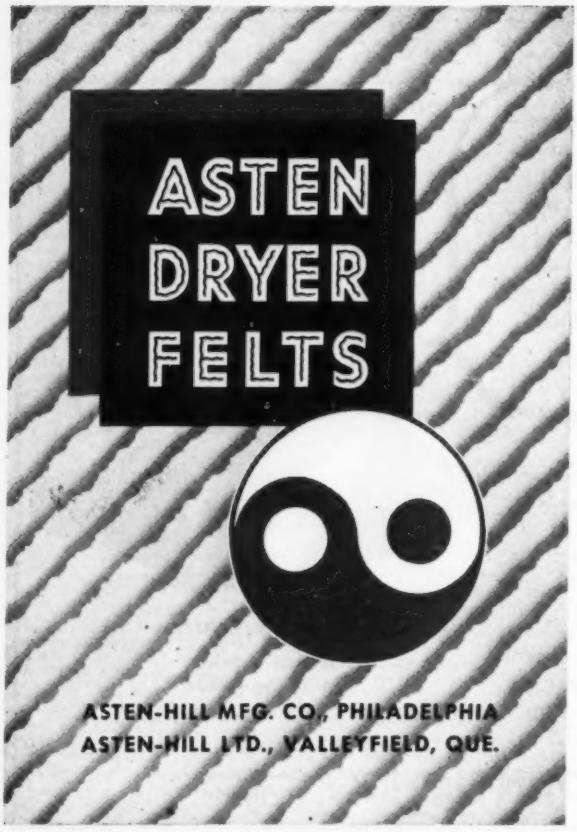

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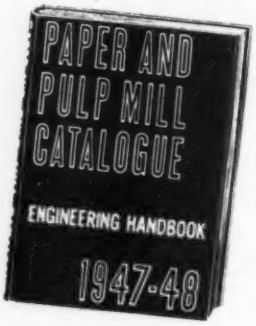

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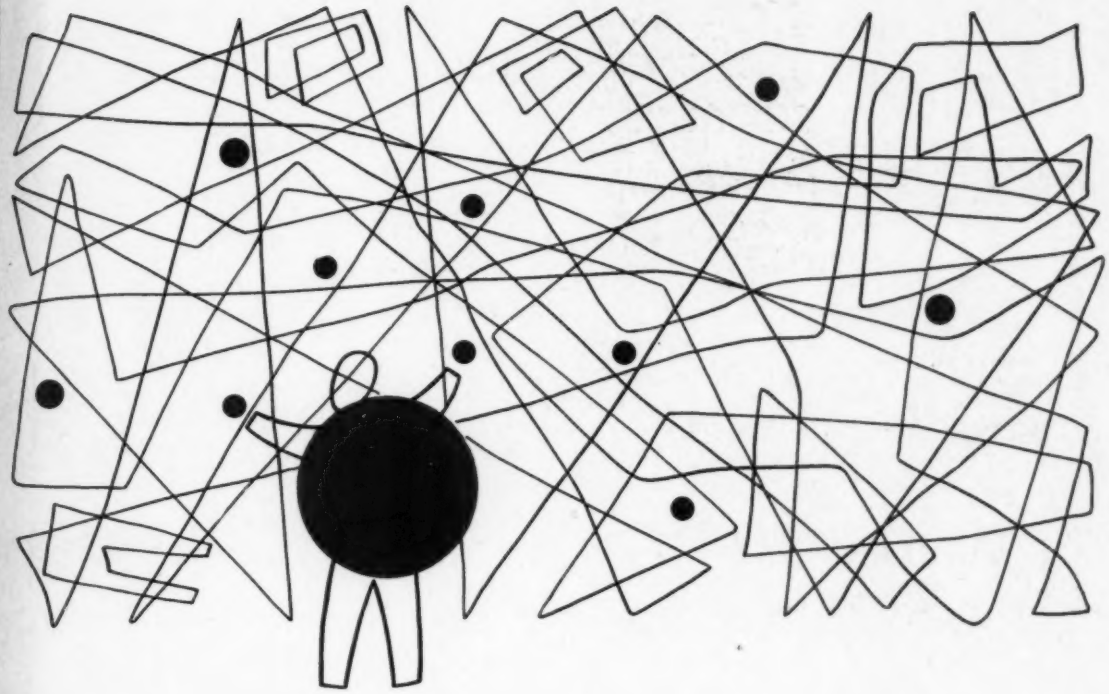

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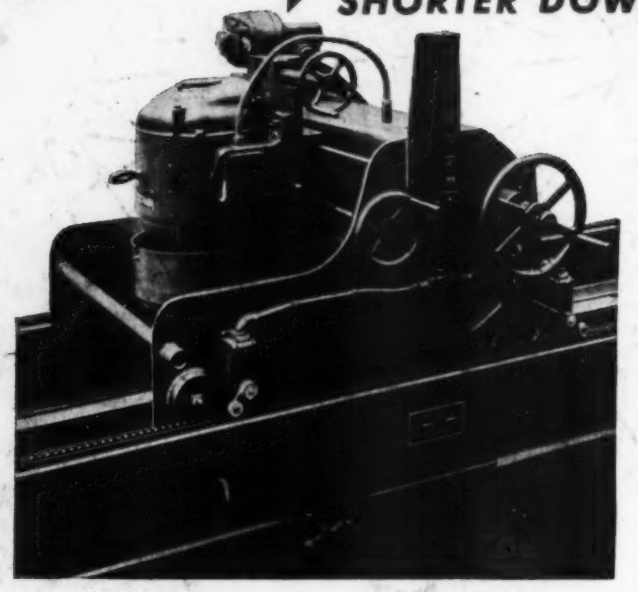

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The push-button panel gives quick, complete control. All adjustments, feeds and controls for both the grinding motor and the traverse motor are grouped conveniently together. There are limit switches at each end of the conditioner and the carriage will either travel from start to finish and stop there, or will travel from start to finish and return to the starting position. The choice is made by push-button. Adjustable stops permit any length box to be ground automatically.

This new conditioner, a refinement of our standard model, is an even greater time saver. Its ease of operation encourages tip-top maintenance of suction-box covers, which means wires last longer.

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It will handle suction boxes and forming boards up to 24" wide, or *two standard width suction boxes at the same time.*

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A push-pull clutch knob allows the head to be traversed either by hand, with the carriage feed handwheel, or by power through a ratio-motor.

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A cross feed handwheel moves the grinding motor from side to side. The vertical feed handwheel assures accurate co of the amount of stock to be removed from the cover. stone dresser will quickly and accurately dress the hollow wheel which has proven so successful on the grinders no operation.

A splash pan collects the water from the conditioning eration at a central point. There are two jack screws w centrally support the wide forming boards or two suction b to minimize deflection.

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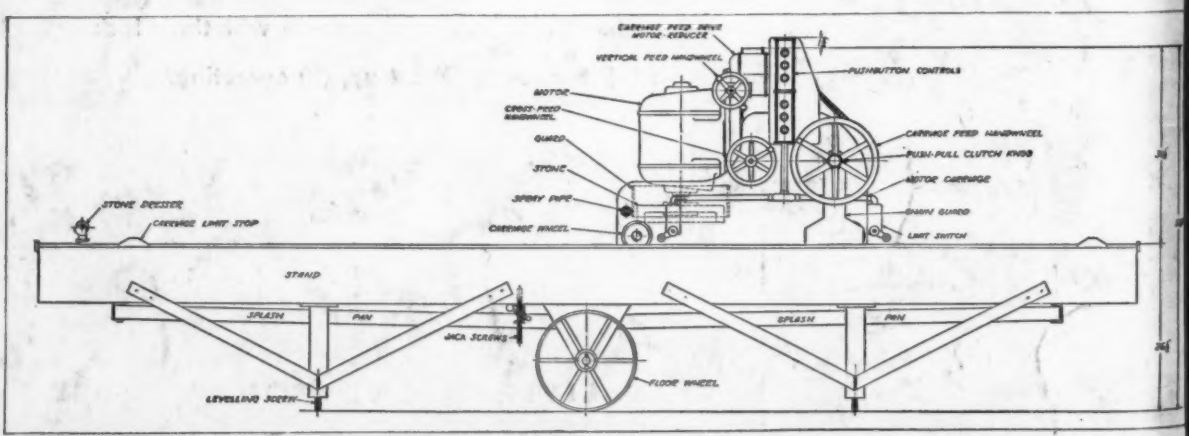

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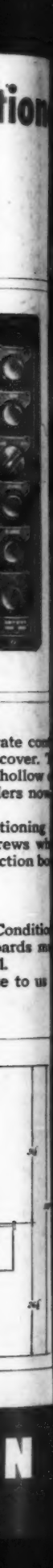
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